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A REVISION OF THE PALAEOTROPICAL ARBOREAL ANT GENUS *CATAULACUS* F. SMITH (HYMENOPTERA : FORMICIDAE)

B. BOLTON

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BY
BARRY BOLTON K

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By B. BOLTON

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SYNOPSIS

The ant genus *Cataulacus* F. Smith is fully revised. The species of the Ethiopian and Malagasy regions are treated and keyed out separately from those of the Indo-Australian and Oriental regions; keys to the worker caste are provided for both groups, and for the second group keys to the known females and males are also provided. Fifty-one extant species are recognized as valid and the four known fossil species are reviewed. The seven recognizable species-groups are discussed and the constituent species described. Eight new species are described, four from the Ethiopian region and four from the Indo-Australian region. Sixty names, mostly of infraspecific forms, are newly synonymized. No subgenera are recognized. All known biological information on the various species is included.

INTRODUCTION

THE ant genus *Cataulacus*, as constituted at the present time, includes some 51 extant and 4 fossil species, the living forms distributed throughout the Old World tropics with the exception of New Guinea and the Australian land mass. The living species are not evenly distributed, the majority being found in the Ethiopian region. In the zoogeographical regions occupied by members of the genus the species are distributed as follows:

Ethiopian region: 27 species (26 endemic)
Malagasy region: 8 species (7 endemic)
Oriental region: 6 species (5 endemic)
Indo-Australian region: 12 species (11 endemic).

The main centres of speciation are the Ethiopian region, particularly the rain forest zones, and the Indonesian and Philippine islands in the Indo-Australian region. Madagascar shares a single species with southern Africa and this and some of its remaining species are members of the now dominant species-group of eastern and southern Africa, the *intrudens* (F. Smith) group. The rest of the Madagascan fauna is, however, very specialized and not of the *intrudens*-group. In fact these species are related to *huberi* E. André and its allies, a group predominantly of the West and Central African rain forests. This apparently indicates a double migration of species in the direction Africa → Madagascar, the first consisting of *huberi*-group species and the second and later migration of *intrudens*-group forms.

The Indian subcontinent is very poorly populated at species level, only 3 being known, and with a fourth present on Ceylon and the Andaman Islands. Only a single species, *granulatus* (Latreille), is known to occur in both the Oriental and Indo-Australian regions. The most easterly record of the genus is from Waigeo Is., off north-west New Guinea (Irian Barat), and a marked decrease in the number of species occurs along the Indonesian islands in a west-east direction, as discussed in the introduction to the species of the region.

The fossil species are known mostly from areas now well outside the range of the genus, namely southern and eastern Europe, and indicate a much wider distribution for the genus during Tertiary times.

At no point in its range can any species of *Cataulacus* be considered dominant over other arboreal ant genera, nor are they known to be abundant in absolute numbers over wide areas, but certain species are noticeably much more common within their range than others and where such species occur they may constitute a good proportion of the arboreal ant fauna and are usually quite conspicuous. In this last category may be placed *guineensis* F. Smith of the West and Central African forests, *intrudens* of southern and eastern Africa and *granulatus* of the Oriental and Indo-Australian regions.

All known species are arboreal or subarboreal nesters and they predominantly forage on the trees and shrubs in which the nests are situated. Very few appear to come down to ground level but in West Africa the small species *pygmaeus* E. André and *brevisetosus* Forel may be found foraging in leaf litter or crossing the ground to ascend a tree other than the one in which the nest is situated. The nests themselves are usually constructed in small hollow twigs or stems by the smaller species and in rotten branches or rotted portions of the tree trunk by the larger species. This is rather a generalization as some small species are known which nest in and under rotten bark (e.g. *vorticus* sp. n.) and undoubtedly some of the larger forms will eventually be found inhabiting relatively small cavities in plants. Various species of the genus in Africa are known to inhabit a variety of galls, acacias and bushes as well as large trees. Other than forest trees the plants known to harbour *Cataulacus*, many of them myrmecophiles, and the species which inhabit them are summarized below; the authority for each discovery is noted in parentheses.

intrudens (F. Smith): in acacia thorns (F. Smith, 1876 : 609; Arnold, 1917 : 391)
: in galls (Forel, 1894 : 78)
: in *Combretum apiculatum* Sond (Prins, 1965 : 104)
weissi Santschi: in galls (Bequaert, 1922 : 370)
: in *Randia myrmecophila* De Wildeman (Forel, 1916 : 427)
: in *Plectronia* sp. (Wheeler, 1922*a* : 199)
bequaerti Forel: in galls (Bequaert, 1922 : 370)
brevisetosus Forel: in acacia (Arnold, 1917 : 398)
: in *Theobroma cacao* L. (present author, see below)
pilosus Santschi: in *Cuviera angolensis* Hiern (Bequaert, 1922 : 490)

Of the species found on cocoa in West Africa probably the most common is *guineensis*. In a survey conducted in Nigeria, Booker (1968) noted three species on cocoa whilst Room (1971) listed five species from a Ghanian cocoa farm. These were *pygmaeus*, *guineensis*, *mocquerysi* (sp. K, in Room), *egenus* (sp. G, in Room) and probably *vorticus* (sp. H, in Room). A survey by the present author in Nigeria and Ghana revealed these same five species along with *brevisetosus*, noted above. Specimens received in 1968 from M. B. de Miré of the Institut français du Café, du Cacao, Cameroun suggest that *kohli* nests in cocoa trees in that country; and *theobromicolus* from Zaire probably also nests in cocoa.

Feeding habits in the genus are mostly unknown but Arnold (1917 : 388) has recorded an unidentified species breaking into termite tunnels and attacking the inmates, and the present author has noted *guineensis* tending aphids and small coccids.

On the plants ants of the genus *Cataulacus* often occur together with *Oecophylla* F. Smith or species of *Crematogaster* Lund, and appear to be mostly tolerated (at least they are not evicted) by the majority of these forms. Their defence against attackers of these genera lies primarily in their armoured exterior, but their ultimate escape reaction is to curl up and release their grip on the plant, falling to the ground and thus making their escape. The decision to remain immobile and present an armoured surface or to drop from the plant appears to depend upon the size or persistence of the aggressor; larger attackers usually precipitate the latter reaction, but it has also been noted as a result of persistent and unwanted attention by a series of workers of a small *Crematogaster* species.

Although considerably over a century old the genus, as such, has not been revised previously. Indeed the majority of earlier authors passed it over without comment or criticism and no check whatever was placed upon the amazing and completely uncalled for proliferation of specific and infraspecific names, especially amongst the African forms. The haphazard and often irrelevant descriptions by F. Smith during the third quarter of the last century led to the redescription as new of many of his species by later authors who, quite understandably, could not correlate Smith's descriptions with the specimens available to them. This tradition was continued by numerous authors who relied upon trivial differences in sculpturation, shape and size to delimit their species or infraspecific forms and the accurate and detailed descriptions of Mayr and Emery stand in complete contrast to the majority of descriptions produced in the first two decades of this century, most of which are almost valueless.

Arnold (1917) was the first to draw attention to the sorry state of affairs in the genus when he monographed the species of South Africa. He pointed out that he had not attempted to key the species as, 'many of the so-called species and races are very closely allied', and he considered that a study based on more material would reduce the number of species to a much lower figure. Despite this he did attempt a key to the South African species in the next part of his monograph (Arnold, 1920 : 403), prefacing it with the remarks, 'I have endeavoured to draw up a key to the six forms which I have seen, but in view of the trifling distinctions on which authors have seen fit to erect new species in this genus, too much reliance should not be placed on it.' The Oriental regional fauna escaped to a great extent the proliferation of names characteristic of the African fauna and this is probably attributable to the quite early publication of a key by Forel (1902) and more notably of a key and descriptions by Bingham (1903), the latter of which did much to fix the identity of the more common species and indeed some of the rarer ones. The Indo-Australian, Malagasy and Ethiopian regional faunas apart from those of South Africa have not previously been keyed.

The present study has reduced the number of names in the genus to about half, mostly by the synonymy of infraspecific forms. Eight new species have been described, the majority from material loaned by various museums and institutions, but it seems apparent that numerous new species await discovery and it is to be hoped that this paper stimulates some interest in the biology and ecology of this remarkable group of ants, which are mostly unknown at the present time.

ABBREVIATIONS OF MUSEUMS AND INSTITUTIONS

AMNH, New York	American Museum of Natural History, New York, U.S.A.
BMNH	British Museum (Natural History), London, England.
IE, Bologna	Istituto di Entomologia dell'Università, Bologna, Italy.
MCSN, Genoa	Museo Civico di Storia Naturale, Genoa, Italy.
MCZ, Boston	Museum of Comparative Zoology, Cambridge, Mass., U.S.A.
MHN, Geneva	Muséum d'Histoire Naturelle, Geneva, Switzerland.
MNHN, Paris	Muséum National d'Histoire Naturelle, Paris, France.
MNHU, Berlin	Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (D.D.R.).
MRAC, Tervuren	Musée Royal de l'Afrique Centrale, Tervuren, Belgium.
NM, Basle	Naturhistorisches Museum, Basle, Switzerland.
NM, Vienna	Naturhistorisches Museum, Vienna, Austria.
NMR, Bulawayo	National Museum of Rhodesia, Bulawayo, Rhodesia.
UG, Accra	University of Ghana, Legon, Accra, Ghana.
UM, Oxford	University Museum, Oxford, England.
USNM, Washington	United States National Museum, Washington D.C., U.S.A.

MEASUREMENTS AND INDICES

The following dimensions and ratios have been found to be useful in separating species in the genus; all measurements are expressed in millimetres.

Total Length (TL). The total outstretched length of the individual, from the mandibular apex to the gastral apex.

Head Length (HL). The length of the head proper, measured in a straight line from the anterior clypeal margin to the mid-point of the occipital margin, in full-face view.

Head Width (HW). The maximum width of the head behind the eyes, measured in full-face view.

Cephalic Index (CI). $\frac{\text{HW} \times 100}{\text{HL}}$

Eye Length (EL). The maximum length of the eye, measured in dorsal full-face view.

Ocular Index (OI). $\frac{\text{EL} \times 100}{\text{HW}}$

Inter-Ocular Distance (IOD). The distance between the inner margins of the eyes at their midlength in full-face view.

Scape Length (SL). The straight-line length of the elongate first antennal segment excluding the basal constriction or neck. Usually measured in side-view with the scape in its scrobe as it is usually in this position in mounted specimens.

Scape Index (SI). $\frac{\text{SL} \times 100}{\text{HW}}$

Pronotal Width (PW). The maximum width of the pronotum in dorsal view.

Alitrunk Length (AL). More exactly Weber's AL; the diagonal length of the alitrunk in lateral view from the point at which the pronotum meets the cervical shield to the apex of the metapleural lobes or teeth.

Metathoracic Tibial Length (MTL). The maximum length of the tibia of the metathoracic (hind) pair of legs.

DEFINITION OF, AND NOTES ON, THE GENUS

CATAULACUS F. Smith

Cataulacus F. Smith, 1853 : 225. Type-species: *Cataulacus taprobanae* F. Smith, loc. cit., by subsequent designation of Bingham, 1903 : 120.

Otomyrmex Forel, 1891*a* : 147 [subgenus of *Cataulacus*]. Type-species: *Cataulacus oberthueri* Emery, *in* Forel, op. cit.: 146, by monotypy. **Syn. n.** (See note 3, below.)

DIAGNOSIS. Monomorphic, arboreal myrmicine ants with the head and usually also the body somewhat depressed. Antennae 11-segmented with a 3-segmented club. Palp formula

5,3. Anterior clypeal margin usually notched or impressed medially. Frontal carinae very widely separated, strongly expanded. Antennal scrobes present, running below the large eyes, bounded by the frontal carinae only anterodorsally. First gastral tergite very much enlarged, constituting the entire dorsal gaster in female and worker and the greater portion of the dorsum in the male. Wings always with *r–m* and *m–cu* absent, and with *M* fused to *Rs* until close to *2r*. Male genitalia partially retractile, with cuspis of volsella absent, digitus strongly developed into a broadly T-shaped structure; aedeagus serrate or denticulate ventrally.

DEFINITION. *Worker*. Minute to large (TL 2·7 – 11·0), mostly black myrmicine ants; monomorphic although often with a considerable size-range within the species, and with the head and body somewhat dorsoventrally flattened.

Mandibles with 1 to 3 apically situated teeth followed by a row of small to minute denticles or by an unarmed apical (masticatory) margin. Palp formula maxillary 5, labial 3-segmented. Clypeus large, rounded behind, usually notched or with an arcuate impression anteromedially and with the anterolateral corners acute or dentate. Clypeal suture often reduced or faint but rarely completely absent. Frontal carinae widely separated, strongly expanded laterally, reaching almost or quite to the level of the eye where they are almost invariably produced into a preocular tooth. The frontal carinae usually overhang the sides of the head of front of the eye and form the apparent lateral margins of the head in front of the eye in full-face view. Antennal scrobes present, running below the eyes and capable of accommodating the whole antenna. Anteriorly the scrobes are bounded above by the frontal carinae but below and behind the eyes the scrobal margins are constituted of the side wall of the head capsule. Scrobes often bounded below by a carina which terminates in a ventrally-directed tooth posteriorly. Antennae 11-segmented, the three apical funicular segments forming a club. Scape curved and much thicker apically than basally. The eyes are distinct, usually large or very large; ocelli are absent (except in some individuals of *latus*). Alitrunk usually marginate laterally at least on the pronotum (faint in *oberthueri*, absent from *insularis*), the margination often equipped with denticles, spines, teeth or lobiform prominences. Dorsal alitrunk often without sutures but the promesonotal suture may be marked by a faint line or impression. Sutures visible laterally upon the alitrunk; a transverse suture on the mesepisternum nearly always evident. Mesokatepisternum with the anteroventral corner produced into a spine, tooth or tubercle, rarely only an acute angle. Propodeum usually bispinose, more rarely bidentate, unarmed in one species (*inermis*); metapleural lobes or teeth present at the base of the propodeal declivity. Legs with the femora usually grooved or bicarinate beneath to receive the tibiae. Petiole sessile, with a distinct ventral process; in some species the postpetiole also with such a process. First gastral tergite greatly expanded, comprising the whole of the dorsum of the gaster in dorsal view. First sternite also much enlarged, the remaining segments very reduced, visible apically and apicoventrally. Sting reduced or vestigial, apparently non-functional. Hairs in the species are typically short, broad and blunt but variously specialized in some species, absent in others; almost invariably with 3 to 4 long bristles projecting from the lower border of the eye. Full adult coloration uniform black or black-brown, commonly with the antennae, tibiae and tarsi lighter, yellow or yellow-brown.

Female. Similar to the worker but the head always with ocelli developed, the alitrunk with flight sclerites and with well-marked dorsal sutures. Venation as shown in Text-figs 1–4, discussed below (note 4). Gaster usually more elongate than in the worker and often with virtually parallel lateral borders.

Male. Head constructed basically as in worker but with ocelli present. The frontal carinae are not so strongly expanded laterally and in some species the sides of the head proper are visible below the carinae when in dorsal view. Preocular teeth often absent. The head capsule itself is strongly narrowed in front of the large, very prominent eyes. Pronotum well developed, clearly visible in dorsal view and not at all overhung by the mesoscutum. Parapsidal furrows present. Notauli usually with the anterior arms of the Y-shape developed and cross-ribbed; the posterior arm often little or not developed, rarely as well developed as the anterior arms. Venation as in the female. Propodeum bidentate or bispinose; the petiole and sometimes also the postpetiole more elongate and slender than in the female or worker castes but the ventral processes similarly developed. First gastral tergite very large but not as strongly developed as in the other castes; the following segments usually visible in dorsal view. Genitalia partially retractile, but the highly sclerotized apical portions of the parameres always projecting. In species examined the genitalia had the aedeagus at least strongly serrate ventrally, usually denticulate; volsellae with cuspis absent and the digitus developed into a much enlarged, broadly T-shaped lamelliform structure. The basal portion of each paramere is much less strongly sclerotized than the apical, projecting portion, the latter usually with numerous fine hairs.

Larva. G. C. Wheeler & J. Wheeler (1960) defined the larvae as follows: body profile elongate-subelliptical, with the head applied to the ventral surface near the anterior end. Under this grouping the *Cataulacus* larvae were given as cataulaciform; with the body profile straight, elongate-subelliptical; prothorax forming a very short, stout neck which is inclined ventrally to 45 degrees; segmentation indistinct. The mandibles were also described as cataulaciform: roughly trapezium-shaped, the apex forming a slender, short acute tooth which is curved medially; subapical portion of medial border more or less projecting and bearing 2 to 5 minute teeth.

Pupa. Free, not enclosed in cocoons.

NOTES ON THE GENUS.

1. At present the genus *Cataulacus* stands as the sole member of the tribe Cataulacini, but after the erection of the genus it was treated by Smith (1876) as a member of the family Cryptoceridae, in which he also included *Meranoplus* F. Smith, and the constituents of the present tribe Cephalotini. Emery (1893*b*) suggested the dissolution of this patently artificial and very mixed group, and went so far as to note that *Cataulacus* formed a distinct group on its own. During his attempt to overhaul the higher classification of the Formicidae, Forel (1917*a*) created a section Rhagiomyrmicinae to include myrmicine ants characterized by 'the flattening of the head and often the entire body, and also by the numerous lateral appendages of the latter'. These criteria resulted in the aggregation of five tribes (by modern standards) under one section which, incidentally, came very close to F. Smith's concept of a family Cryptoceridae. The included tribes were the Basicerotini, Cataulacini, Cephalotini (=Cryptocerini), Dacetini and Stegomyrmecini, and they are only linked by the trivial and inconsistent characters given by Forel, which are certainly the results of convergence rather than an expression of actual relationship. Emery (1921) rightly criticized this grouping as unnatural and referred Rhagiomyrmicinae to the synonymy of the various tribes involved.

The genus *Cataulacus* now stands in isolation, its derivation and affinities not understood, but it is certainly not closely related to any of the tribes with which it was traditionally grouped.

2. Detailed larval descriptions are given by G. C. Wheeler & J. Wheeler (1954 : 149–151) for the species *egenus*, *horridus* (now a synonym of *insularis*) and *taprobanae*. The material studied for this last species was stated as '20 larvae from the Philippine Islands'. As this is the case then the species in question is not *taprobanae*, which is

restricted to India and Ceylon, but most probably either *catuvolcus* or *chapmani*, species related to *taprobanae*, from the Philippines.

3. The subgenus *Otomyrmex* was erected by Forel (1891*a*) to include the rather aberrant Madagascan species *oberthueri*. The characters which he used to separate the subgenus rested chiefly upon the prolongation of the occipital spines, but he also mentions that the pedicel segments are elongate, much longer than broad, and that the legs lacked asperities. Wheeler (1922*b* : 665) stated that he could not recognize the subgenus as the character of elongate occipital corners was found among many species of *Cataulacus*. This is correct, and the corners are particularly strongly and more impressively developed in *insularis*. Of Forel's other characters, elongate pedicel segments, where the length exceeds the width are not uncommon and neither are relatively smooth legs, especially in the *huberi* species-group. The present survey has shown *oberthueri* to be a member of this last group but very specialized structurally by the reduction of various characters. In consequence *Otomyrmex* has been placed in the synonymy of *Cataulacus*.

4. Venation in the Formicidae has been investigated by Brown & Nutting (1950), who show that the form of venation encountered in *Cataulacus* has been developed in numerous other groups and appears to be reasonably stable. The major features of the venation are shown in Text-figs 1–2, and the principal reductions in Text-figs 3–4. The main characters of the venation are that cross-vein *m–cu* is absent and that *r–m* has been lost either by fusion to $Rs + M$ which is often much thickened before the splitting off of M (Text-fig. 1) or by contraction (Text-fig. 2). The compound vein $Rs + M$ may split into its component parts either proximal to, at, or distal to the junction with cross-vein 2*r*, with the last of these appearing to be predominant. The first possibility is seen in *latus*, the second in *catuvolcus* and some females of *granulatus*, and the third in *egenus*, but the situation is quite variable even in different individuals from the same series. In *catuvolcus* (Text-fig. 4) and some *granulatus* the descending portion of *Rs* is broken. The reduction in length of *M* is common in the genus as is the reduction of *CuA* and the distal portion of *Rs*. The cross-vein *cu–a* is often incomplete, but in a male of *egenus* and a female of *huberi* examined it was double.

5. The occipital crest is a character of use in separating some species of the genus and is defined as follows: a transverse ridge, or carina or row of denticles, or a combination of both, running across the posterior border of the head and effectively separating the vertex from the occiput. The various development of the crest may be seen in Text-figs 37, 41, 39, where it is simple in *catuvolcus*, denticulate in *nenassus* and absent from *hispidulus*.

THE SPECIES OF THE ETHIOPIAN AND MALAGASY REGIONS

Thirty-four species are known from the Ethiopian and Malagasy regions, of which 7 are peculiar to Madagascar and its island systems. A single species is found on Madagascar which is also known from southern Africa but otherwise the Malagasy fauna is quite distinctive.

The study of the species of these regions is by necessity based upon the worker caste as the sexual forms remain unknown in a majority of cases.

The species fall into four groups which are listed below, along with their synonyms. Characterizations of the groups are given under the appropriate sections. Previous notes on the biology of the Ethiopian regional fauna are to be found in Arnold (1917) and Wheeler (1922*a*), and the species known at that time were catalogued by Wheeler (1922*c*). References to nest sites, etc., are scattered through the literature of original descriptions; these have been noted in the systematic treatment by species.

Unsurprisingly the majority of species are forest-dwelling forms, with relatively few adapted to savannah or veldt conditions. Those which do, however, occur in these zones tend to be very successful in their chosen habitat and often possess a wide distribution. A few species are apparently able to exist in any region of Africa providing the basic essentials of nesting-site and food supply are met with, but on the whole the fauna may be divided into forest and non-forest forms.

***huberi*-group**
- ***egenus*** Santschi
  - *egenus* st. *simplex* Santschi **syn. n.**
- ***huberi*** E. André
  - *huberi* var. *longispinus* Stitz **syn. n.**
  - *huberi* race *herteri* Forel **syn. n.**
  - *huberi* subsp. *guilelmi* Wheeler **syn. n.**
  - *huberi* st. *herteri* var. *luebensis* Santschi (unavailable name)
- ***inermis*** Santschi
- ***kohli*** Mayr
  - *kohli* st. *brazzavillensis* Santschi **syn. n.**
  - *foveolatus* Stitz **syn. n.**
  - *latipes* Menozzi **syn. n.**
- ***lobatus*** Mayr
- ***oberthueri*** Emery
- ***porcatus*** Emery
- ***pullus*** Santschi
  - *coriaceus* Stitz **syn. n.**
  - *pullus* var. *orientalis* Santschi **syn. n.**
- ***regularis*** Forel
- ***tardus*** Santschi
  - *schoutedeni* Santschi **syn. n.**
- ***theobromicolus*** Santschi
- ***wasmanni*** Forel

***tenuis*-group**
- ***adpressus* sp. n.**
- ***brevisetosus*** Forel
  - *lujae* Forel **syn. n.**
  - *lujae* var. *gilviventris* Forel **syn. n.**
  - *jeanneli* Santschi **syn. n.**
  - *pygmaeus* st. *degener* Santschi **syn. n.**
  - *pygmaeus* st. *lujae* var. *plebeja* Santschi (unavailable name)
  - *janneli* (sic) var. *loveridgei* Santschi **syn. n.**
  - *meduseus* Santschi **syn. n.**

- ***difficilis*** Santschi
- ***elongatus*** Santschi
- ***impressus* sp. n.**
- ***pilosus*** Santschi
- ***striativentris*** Santschi
  - *donisthorpei* Santschi **syn. n.**
- ***tenuis*** Emery
- ***vorticus* sp. n.**
- ***weissi*** Santschi
  - *traegaordhi* var. *plectroniae* Wheeler **syn. n.**
  - *jeanneli* st. *kenyensis* Santschi **syn. n.**

***intrudens*-group**

- ***bequaerti*** Forel
- ***ebrardi*** Forel
- ***fricatidorsus*** Santschi
- ***intrudens*** (F. Smith)
  - *intrudens* var. *rugosus* Forel **syn. n.**
  - *hararicus* Forel **syn. n.**
  - *johannae* Forel **syn. n.**
  - *baumi* Forel **syn. n.**
  - *baumi* race *batonga* Forel **syn. n.**
  - *baumi* race *batonga* var. *bulawayensis* Forel (unavailable name)
  - *rugosus* var. *subrugosus* Santschi **syn. n.**
  - *intrudens* st. *intermedius* Santschi **syn. n.**
  - *johannae* race *densipunctatus* Stitz **syn. n.**
  - *baumi* st. *pseudotrema* Santschi **syn. n.**
  - *baumi* var. *gazanus* Santschi **syn. n.**
  - *baumi* st. *pseudotrema* var. *tangana* Santschi (unavailable name)
  - *foveosquamosus* Santschi **syn. n.**
  - *umbilicatus* Santschi **syn. n.**
  - *rugosus* var. *krugeri* Prins (unavailable name)
- ***micans*** Mayr
  - *intrudens* st. *tristiculus* Santschi **syn. n.**
- ***mocquerysi*** E. André
  - *mocquerysi* var. *nainei* Forel **syn. n.**
- ***pygmaeus*** E. André
  - *pygmaeus* var. *chariensis* Santschi **syn. n.**
  - *pygmaeus* var. *bakusuensis* Forel **syn. n.**
  - *traegaordhi* Santschi **syn. n.**
  - *trägårdhi* [sic] var. *ugandensis* Santschi **syn. n.**
  - *marleyi* Forel (provisional synonym)
  - *jeanneli* var. *aethiops* Santschi **syn. n.**
  - *pygmaeus* subsp. *suddensis* Weber **syn. n.**
- ***voeltzkowi*** Forel
- ***wissmanni*** Forel
  - *wissmanni* race *otii* Forel **syn. n.**
  - *wissmanni* st. *linearis* Santschi **syn. n.**
  - *micans* race *durbanensis* Forel **syn. n.**

***guineensis*-group**

- ***erinaceus*** Stitz
  - *princeps* 'Emery' (nomen nudum)
  - *erinaceus* var. *crassispina* Santschi **syn. n.**
- ***greggi* sp. n.**

guineensis F. Smith
parallelus F. Smith **syn. n.**
guineensis race *sulcinodis* Emery **syn. n.**
sulcatus Stitz
sulcatus var. *alenensis* Stitz **syn. n.**
sulcatus var. *fernandensis* Stitz **syn. n.**

KEY TO THE SPECIES OF THE ETHIOPIAN AND MALAGASY REGIONS

(Based on worker caste)

Note: because of sculptural variation *intrudens* is keyed out in two places.

1 Propodeum completely unarmed, without spines or teeth; propodeal dorsum transversely rugulose. (Zaire) . . . . ***inermis*** (p. 21)

– Propodeum armed, usually with a pair of distinct spines, more rarely with a pair of short teeth; if the latter then the propodeal dorsum is not transversely rugulose . 2

2 First gastral tergite with a lateral margination or carina at least basally which is paralleled by a similar structure on the first sternite. Node of petiole transversely rectangular in dorsal view, strongly transversely rugose or sulcate . . . 3

– First gastral tergite rarely with, usually without a lateral margination or carina basally, this structure never developed upon the sternite. Node of petiole usually not transversely rectangular in dorsal view, rarely transversely sculptured . 4

3 Sides of head behind eyes irregular, either denticulate, crenulate or otherwise jagged. Relatively broader-headed species, CI > 125, the head strongly broadened behind the eyes. Laterally projecting hairs on the sides of the head behind the eyes long and conspicuous. (West and Central Africa, Uganda, Zambia) . ***huberi*** (p. 19)

Sides of head behind eyes regular, smooth, neither denticulate nor crenulate. Relatively narrower-headed species, CI 120 or less, the head not strongly broadened behind the eyes. Laterally projecting hairs on the sides of the head behind the eyes minute and inconspicuous or completely absent. (West and Central Africa) . . . . ***egenus*** (p. 18)

4 Petiole and postpetiole strongly transverse, much flattened dorsoventrally, without nodes; both very broadly and thickly V-shaped in dorsal view. Propodeal spines very small, inconspicuous, reduced to a pair of short or minute triangular teeth. (West Africa, Zaire) . . . . ***mocquerysi*** (p. 47)

– Petiole and postpetiole nodiform, not strongly transverse nor flattened, not broadly V-shaped in dorsal view. Propodeal spines well developed, conspicuous, not reduced to triangular teeth 5

5 Occipital corners of head drawn out into a long, very broadly triangular point on each side. Sides of head behind eyes and lateral margins of alitrunk without denticles, the alitrunk laterally also without projecting lobes, teeth or prominences. Preocular tooth absent. Very large species, HW > 2·60 with relatively very small eyes, OI < 22. (Madagascar) . . . . ***oberthueri*** (p. 24)

– Occipital corners of head with a tooth, a denticle or unarmed, but not drawn out into a long, broadly triangular point. Sides of head behind eyes or margins of alitrunk usually denticulate, or the alitrunk laterally with projecting lobes, teeth or prominences. Preocular tooth usually present. Smaller species, HW < 2·60 with relatively larger eyes, OI > 22 6

6 In profile the dorsal surfaces of the head behind the clypeus and the dorsal alitrunk without projecting erect hairs (a few may be present on the margins and around the eyes) or with sparse, strongly adpressed hairs 7

– In profile either the dorsal surfaces of the head behind the clypeus or the dorsal alitrunk or both with projecting, erect hairs, often numerous but sometimes sparse or short and inconspicuous; never strongly adpressed 14

7 Mesonotum regularly longitudinally striate, the propodeal dorsum regularly transversely striate. (Madagascar: Ste. Marie Is.) . . ***wasmanni*** (p. 29)

– Sculpturation of mesonotum and propodeal dorsum either not striate or regularly longitudinally sculptured throughout, the direction of sculpturation not differing on mesonotum and propodeal dorsum 8

8 Dorsum of alitrunk sculptured with regular, parallel, longitudinal sulci throughout . 9

– Dorsum of alitrunk finely and densely reticulate-punctate with fine, longitudinal rugulae or a rugoreticulum 10

9 Dorsum of head evenly longitudinally sulcate, as the alitrunk. Dorsum of alitrunk without short, strongly adpressed hairs. Larger species, HL $> 1{\cdot}10$, PW $> 0{\cdot}90$, with relatively broader head and smaller eyes, CI 100 or more, OI < 40. (Madagascar) . . . . ***regularis*** (p. 27)

– Dorsum of head finely reticulate-punctate with an overlying rugoreticulum, contrasting to the sulcate alitrunk. Dorsum of alitrunk with a few scattered, small, strongly curved, adpressed hairs, best seen upon the propodeal dorsum. Smaller species, HL $< 0{\cdot}95$, PW $< 0{\cdot}75$ with relatively narrower head and larger eyes, CI < 95, OI > 50. (Ghana) . . . . . ***adpressus*** (p. 30)

10 With the head in full-face view the lateral margins between the eyes and the occipital corners equipped with a continuous row of short, freely projecting hairs . . 11

– With the head in full-face view the lateral margins between the eyes and the occipital corners without a row of short, projecting hairs. If one or two hairs are present they are minute and do not project freely beyond the margins. (West and Central Africa) . . . . ***tardus*** (p. 27)

11 Dorsum of petiole transversely rugose, the first gastral tergite very finely and densely longitudinally arched-rugulose, the rugulae converging upon the midline at least anteriorly, and often subcircular in organization. (West and Central Africa, Uganda) . . . . ***kohli*** (p. 22)

– Dorsum of petiole not transversely rugose; the first gastral tergite predominantly finely and densely reticulate-punctate. A few basigastric rugulae may be present as may a few rugulae upon the disc, but the sculpturation not as above . . . 12

12 Postpetiole divided into two lobes by a strong, median longitudinal cleft dorsally. Lateral pronotal margins without differentiated, projecting teeth. (Cameroun, Zaire) . . . . ***lobatus*** (p. 23)

– Postpetiole not divided into two lobes by a median longitudinal cleft dorsally. Lateral pronotal margins with one or two differentiated projecting teeth . . 13

13 Lateral pronotal margins each with two teeth. Propodeal spines relatively long, about as long as the petiole. (Central Africa, Kenya) . . . . ***pullus*** (p. 26)

– Lateral pronotal margins each with a single tooth situated close to the acute humeral angles. Propodeal spines relatively short, shorter than the length of the petiole. (Zaire) . . . . ***theobromicolus*** (p. 28)

14 Head exceptionally long, distinctly much longer than broad, CI < 80. (Madagascar) ***tenuis*** (p. 37)

– Head not as remarkably elongate, CI > 85, often CI > 100 15

15 Head, alitrunk and pedicel dorsally with strong, undulate, longitudinal sulci, finer upon the head than on the alitrunk. A few short, clavate hairs present on the dorsal alitrunk. (Madagascar) . . . . ***porcatus*** (p. 25)

– Sculpturation not as above, usually rugose or reticulate-rugose with reticulate-punctate interspaces. If the dorsal alitrunk is sulcate then either the head is differently sculptured or the alitrunk hairs are simple 16

16 At least the hairs on the clypeus strongly clavate, spatulate, stalked-suborbicular or otherwise bizarre, usually also on the remainder of the cephalic dorsum. In the majority of cases the apex of each hair is strongly swollen whilst the stem is narrow. Eyes relatively large, OI > 48 17

– All hairs on the clypeus and the remainder of the cephalic dorsum simple, usually short, stout and blunt but sometimes minute, sometimes very long and curved; rarely are they gradually increased in thickness from base to apex. If the last then the eyes are relatively smaller, OI < 47 18

17 Lateral pronotal margins with a tooth at the humeral angle and another at the junction of pro- and mesonotum; the margin between these two teeth without denticles or projecting hairs, smooth and very shallowly concave. (Nigeria, Zaire) . . . . ***vorticus*** (p. 38)

– Lateral pronotal margins with a row of small or minute denticles between the humeral angle and the tooth at the promesonotal junction; and with numerous projecting hairs. (Widespread in Africa) . . . . . ***brevisetosus*** (p. 31)

18 In dorsal view the posterolateral portion of the pronotal margin produced into a spine or triangular prominence. Head relatively broad or very broad, the eyes small, CI > 112, OI < 30 19

– In dorsal view the posterolateral portion of the pronotal margin not produced as above but usually armed with a short tooth or denticle. When a short tooth is present in this position it is usually comparable in size to others upon the pronotal margin. Head relatively narrow, the eyes large, CI 110 or less, OI > 32 . . 20

19 Sculpturation of dorsal alitrunk a very distinct rugoreticulum with reticulate-punctate interspaces. Lateral margins of mesonotum usually with one or more denticles. (West and Central Africa) . . . . ***erinaceus*** (p. 52)

– Sculpturation of dorsal alitrunk variable in intensity but consisting essentially of a longitudinal rugation or sulcation which may be irregular or sinuate. Lateral margins of mesonotum usually without denticles. (West and Central Africa) ***guineensis*** (p. 55)

20 Erect hairs on dorsal surfaces of head, alitrunk, pedicel and gaster abundant, dense, very long, narrow and fine, often curved or even sinuate 21

– Erect hairs on dorsal surfaces of head, alitrunk, pedicel and gaster relatively sparse, short, broad, blunt and coarse, never sinuate 22

21 Propodeal dorsum longitudinally rugulose or rugose. Larger species, HL $> 0{\cdot}90$, HW $> 0{\cdot}85$ with a relatively long alitrunk, AL 1·00 or more. (Ghana, Angola) ***elongatus*** (p. 34)

– Propodeal dorsum transversely rugulose. Smaller species, HL $< 0{\cdot}90$, HW $< 0{\cdot}85$, with a relatively short, broad alitrunk, AL ca 0·80. (Zaire) . . ***pilosus*** (p. 35)

22 First gastral tergite coarsely longitudinally rugose on the disc in the anterior one-third of its length; posteriorly the rugae on the disc running transversely. (Madagascar: Grand Comoro Is.) . . . . ***voeltzkowi*** (p. 50)

– First gastral tergite variously sculptured but never with longitudinal rugae anteriorly and transverse rugae posteriorly upon the disc 23

23 Posterior one-quarter of first gastral tergite coarsely longitudinally rugose, rugulose or striate; this sculpturation always distinct, usually extending to the apex of the tergite, sometimes extending the length of the segment 24

– Posterior one-quarter of first gastral tergite reticulate-punctate or finely superficially sculptured and shining; a few fine, scattered longitudinal rugulae formed by fusion of the margins of aligned punctures may be present 27

24 Dorsal alitrunk and first gastral tergite finely and regularly longitudinally sulcate-rugose throughout their lengths. Smaller species, HW $< 0{\cdot}90$ with relatively large eyes, OI > 49. (Zaire, Kenya) . . . . . . ***striativentris*** (p. 36)

– Dorsal alitrunk reticulate-rugose, reticulate-punctate or both. First gastral tergite not regularly sulcate-rugose throughout its length, usually with puncturation, at least on median portion of disc. Larger species, HW $> 0{\cdot}95$ with relatively smaller eyes, OI < 47 . . . 25

25 Mesonotum reticulate-punctate. First gastral tergite densely and deeply longitudinally striate on the posterior quarter, the preceding half-length of the tergite finely reticulate-punctate. CI 98 or less. (Madagascar) . ***ebrardi*** (p. 41)

– Mesonotum with a rugoreticulum overlying the reticulate-puncturation, the former may be very coarse, masking the latter which is usually best developed on the centre of the disc. First gastral tergite sometimes striate or rugose throughout its length. CI 98 or more (usually > 100) . . . 26

26 Dorsal surfaces of head and alitrunk with numerous conspicuous, relatively long hairs. Sculpturation of dorsal alitrunk a fine and spaced rugoreticulum overlying a fine, dense reticulate-puncturation. Eyes relatively somewhat larger, OI 41 or more. (Mozambique, South Africa) . . . ***wissmanni*** (p. 51)

– Dorsal surfaces of head and alitrunk with relatively few inconspicuous short hairs. Sculpturation of dorsal alitrunk variable; usually a coarse, dense rugulation or rugoreticulum but the rugae may be reduced. Very rarely the mesonotum shagreened, with large foveolae. Eyes relatively somewhat smaller, OI 34 to 40. (South and East Africa, Madagascar) . . . ***intrudens*** (part) (p. 42)

27 Occiput with a distinct transverse groove above the foramen. In profile the mesonotum separated from the propodeal dorsum by a short but distinct step; propodeal dorsum approximately flat and on a lower level than the mesonotum. (Uganda) . . . ***impressus*** (p. 35)

– Occiput without a transverse groove above the foramen. In profile the mesonotum forming a more or less continuous and uninterrupted convex surface with the propodeal dorsum . . . 28

28 Tooth on mesokatepisternum large, long and acute, projecting anterolaterally and clearly visible in dorsal view, projecting beyond the marginations of the mesonotum 29

– Tooth on mesokatepisternum small and short, usually a mere tubercle or acute angle; in dorsal view this tooth not or only very little visible . . . 30

29 Vertex of head meeting occiput in an acute angle; the first gastral tergite very finely reticulate or reticulate-punctate. Larger species, HW $> 0{\cdot}95$, PW $> 0{\cdot}75$ with relatively small eyes, OI < 45 and the head as broad as or broader than long, CI 100 or more. (South Africa) . . . ***micans*** (p. 46)

– Vertex of head running into occiput through a continuous curve, the two surfaces not separated by an acute angle. First gastral tergite coarsely reticulate-punctate. Smaller species, HW $< 0{\cdot}85$, PW $< 0{\cdot}70$ with relatively large eyes, OI > 50 and the head longer than broad, CI < 95. (Dahomey) . . . ***difficilis*** (p. 33)

30 Subpetiolar process complex, anteroventrally with a prominent, broadly rounded angle and posteroventrally with an extended heel or spur. Postpetiole with a strongly developed simple, digitiform ventral process . . . 31

– Subpetiolar process simple, a rectangular or subrectangular lobe without the above configuration or with an acute angle or small tooth posteroventrally; if the latter then the postpetiole without a strongly developed digitiform ventral process. . 32

31 Larger species, HL $> 1{\cdot}00$, HW $> 1{\cdot}00$, PW $> 1{\cdot}00$ with relatively broader head and smaller eyes, CI > 100, OI < 45. Propodeal spines very strongly developed, long, stout, acute and divergent. Posterolateral portion of pronotal margination expanded into a low, broadly triangular extension with denticulate borders. (Zaire) . . . ***greggi*** (p. 54)

– Smaller species, HL $< 1{\cdot}00$, HW $< 0{\cdot}95$, PW $< 1{\cdot}00$ with relatively narrower head and larger eyes, CI < 100, OI > 50. Propodeal spines acute but short and poorly developed. Posterolateral portion of pronotal margination not expanded as above. (West and Central Africa, Kenya) . . . ***weissi*** (p. 39)

32 Smaller species, HW $< 1{\cdot}10$, PW $< 0{\cdot}90$ . . . 33

– Larger species, HW $> 1{\cdot}10$, PW $> 0{\cdot}90$ . . . 34

33 Head longer than broad, CI < 100, with slightly larger eyes, OI 41 or more. Lateral pronotal margins with a regular row of denticles, the margination itself not strongly expanded. First gastral tergite with a few longitudinal rugulae in the middle of the disc. (Widespread in Africa) . . . . ***pygmaeus*** (p. 48)

– Head broader than long, CI > 105, with slightly smaller eyes, OI 41 or less. Lateral pronotal margins with a few irregular, rounded, tuberculiform teeth, the margination itself strongly expanded. First gastral tergite reticulate-punctate in the middle of the disc, without rugulae. (South Africa) . ***fricatidorsus*** (p. 42)

34 Short erect hairs thickly abundant on all dorsal surfaces, especially conspicuous upon the head, where they are very dense. Head relatively somewhat narrower, CI 102 or less, the eyes slightly larger, OI 40 or more. (Zaire) . ***bequaerti*** (p. 40)

– Short erect hairs very sparse and scattered, often virtually absent from the dorsal head and alitrunk. Those present on the dorsal head, pronotum and mesonotum, especially the head, are very short and inconspicuous. Head relatively somewhat broader, CI 103 or more, eyes slightly smaller, OI 40 or less. (South and East Africa, Madagascar) . . . . ***intrudens*** (part) (p. 42)

THE *HUBERI*-GROUP

Small to very large species (TL 4·0 – 11·0 approx.) in which the head is always short and broad, and always broader than long (CI > 100), with a measured range of CI 101–132. The eyes are relatively small or very small, usually with OI < 30, but in *regularis* and in some individuals of *egenus* they may be larger, up to OI 35.

The dorsum of the head capsule behind the clypeus and the dorsal alitrunk are completely devoid of hairs except in *porcatus* where a few short, clavate hairs are present on the latter. Marginal hairs, projecting laterally are common amongst the species on the head and alitrunk. The pronotum is marginate laterally, often strongly so, more rarely the margination is reduced (*oberthueri*) but in no case is it denticulate; although in some species the margin is produced into one or two distinct teeth. Propodeal spines are usually long, stout and acute, but one species lacks such spines (*inermis*). Sculpturation throughout the group is predominantly of a fine and dense reticulate-puncturation with an overlying very weak rugulation or a rugoreticulum. Exceptions are known and in the case of *regularis* and its immediate allies a marked longitudinal sulcation is developed.

In some species of the group large workers are developed which may, if taken singly, appear to belong to separate species as they tend to differ from more usual-sized individuals in details of structure and sculpturation. Some of the synonymy in the group is based upon the description of single specimens of such species, where usually the larger individual is given one name and the smaller another name, for example *coriaceus* and *pullus*; *tardus* and *schoutedeni*. When good series have been acquired the differences between such large and small forms have been nullified.

A number of closely related species pairs occur within the group. For instance *lobatus* and *inermis* share the same development of the postpetiole, with a dorsal longitudinal groove dividing the segment; *egenus* and *huberi* have the same form of petiolar and gastral development; and *regularis* and *porcatus* have longitudinal sulci as their basic sculpturation. The group contains 12 species, of which 4 are peculiar to the Malagasy region. The species are distributed through the forest zones of the two regions, usually in the rain forests of West and Central Africa and eastern Madagascar but also in areas of drier forest.

Cataulacus egenus Santschi

(Text-fig. 1)

Cataulacus egenus Santschi, 1910 : 359, fig. Holotype worker, CONGO (BRAZZAVILLE) : Madingou (*R. P. Zimmermann*) (NM, Basle) [examined].

Cataulacus egenus st. *simplex* Santschi, 1914*b* : 111, fig. 18. Holotype worker, UGANDA: Central Region, i. 1909 (*Ch. Alluaud*) (location of type not known). **Syn. n.**

Worker. TL 4·2–6·1, HL 1·10 – 1·48, HW 1·22 – 1·74, CI 101 – 120, EL 0·40 – 0·48, OI 27 – 33, IOD 1·00 – 1·48, SL 0·62 – 0·80, SI 46 – 52, PW 1·14 – 1·60, AL 1·32 – 1·76, MTL 0·66 – 0·88 (10 measured).

Occipital crest variously developed; either complete or incomplete medially or absent, the last occurring usually in small workers. When the crest is well developed it is little more than an acute angle separating the vertex from the occiput. Occipital corners with a dentiform angle projecting somewhat laterally or the corners merely acutely angled. Sides of head behind eyes smooth and regular, not denticulate nor crenulate. Pronotum marginate laterally, not denticulate, the margination not or only slightly expanded, either simple and following the shape of the segment or with a small, bluntly rounded dentiform process anteriorly. Remainder of alitrunk not marginate and not denticulate, the dorsum rounding smoothly into the sides. Propodeum with a pair of long, acute, slightly divergent spines. Dorsal alitrunk usually without sutures or with the location of the promesonotal suture indicated by a very faint impression. Rarely the metanotal groove is also indicated by an extremely faint marking upon the dorsum. Petiole with the dorsal surface strongly transverse, rectangular or subrectangular in shape; postpetiole also expanded transversely. First gastral tergite marginate basally and for part of the length of the sides; this structure paralleled on the sternite laterobasally by a raised ridge or carina.

Sculpturation of dorsum of head a fine, dense and very shallow reticulate-puncturation which is often more or less effaced, the whole overlaid by a fine, irregular, usually disorganized rugoreticulum. Pronotal dorsum usually similar to the head with the puncturation more distinct, especially upon the anterior half. Remainder of dorsal alitrunk finely reticulate-punctate with numerous very fine rugulae. These are predominantly longitudinal in direction but often a reticulum is present in places. On the propodeal dorsum the rugulae tend to diverge posteriorly towards the bases of the spines and rarely are they transverse upon the dorsum. Declivity of propodeum usually with some transverse rugulae, at least between the spines. Petiole and postpetiole coarsely transversely rugose or sulcate-rugose, the gaster densely reticulate-punctate with a few longitudinal rugulae.

Erect hairs absent from all dorsal surfaces of head, alitrunk, pedicel and gaster, but a few may be present upon the lateral margins of the head. The appendages bear numerous hairs.

Female. TL 6·6 – 7·0, HL 1·40 – 1·50, HW 1·42 – 1·58, CI 101 – 105, EL 0·44 – 0·48, OI 30 – 31, IOD 1·20 – 1·34, SL 0·72 – 0·76, SI 48 – 50, PW 1·34 – 1·50, AL 1·88 – 1·92, MTL 0·76 – 0·88 (3 measured).

Answering the description of the worker but with the usual thoracic modifications. Occipital crest usually developed as an angle. Pronotal marginations less distinct, propodeal spines reduced to a pair of short, broad and blunt teeth. Sculpturation basically as worker but the mesoscutellum may lack rugulae and the propodeal dorsum is usually transversely rugulose. The female of this species was first described by Wheeler (1922*a* : 199).

Male. TL 5·1 – 5·5, HL 0·92 – 1·00, HW 1·10 – 1·16, CI 116 – 119, EL 0·36, OI 31 – 32, IOD 0·90 – 0·96, SL 0·48 – 0·50, SI 42 – 43, PW 1·00 – 1·02, AL 1·58 – 1·68, MTL 0·82 – 0·86 (2 measured).

Occipital crest not present, the occipital corners dentiform. Sides of head behind eyes with one or two denticulae. A pair of small, shallow impressions present upon the vertex, situated just behind and laterad of the posterior ocelli, and almost in a straight line between this and the median (anterior) ocellus. Pronotum weakly marginate laterally, the sides almost straight, not denticulate. Anterior arms of notauli developed and cross-ribbed, fading out medially; the posterior arm absent. Propodeum with a pair of short, broad but acute spines. Segments of pedicel in dorsal view developed as in the worker, but less strongly so. First gastral tergite not marginate, the sternite without a carina.

Sculpturation of head reticulate-punctate in the vicinity of the ocelli, but elsewhere also with sparse rugulation which tends to form a reticulum in places. Pronotal dorsum similar to the last, with a marked rugoreticulum; the sclerites of the mesonotum predominantly reticulate-punctate, with few or no rugulae. Propodeal dorsum coarsely rugose; the segments of the pedicel with marked transverse rugae, especially the petiole. Gaster finely and densely reticulate-punctate. Erect hairs sparse upon the head and alitrunk, numerous on the gaster.

This species is most closely related to *huberi*, sharing the same pedicellar and gastral development, but is separated from it by the characters given in the key. Nests of *egenus* have been found in rotten branches of cocoa trees which are still attached to the trunk. The workers forage actively upon the bark and leaves, but the feeding habits of the species remain unknown.

MATERIAL EXAMINED.

GHANA: Bunso (*D. Leston*); Tafo (*D. Gibbs*). NIGERIA: Gambari (*B. Bolton*); Owena (*J. T. Medler*). UGANDA: n. Buddu (*S. A. Neave*); Nkosi I. (*G. D. H. Carpenter*). ZAIRE: Medje (*H. O. Lang*); Medje (*Bequaert*); Basongo (*H. Schouteden*); Kasai, Ngombe (*H. Schouteden*); Stanleyville (*L. Burgeon*); Luebo, Kamaiembi (*H. Schouteden*); Luebo, Macaco (*H. Schouteden*); Congo da Lemba (*R. Mayné*); Yangambi (*N. L. H Krauss*).

Cataulacus huberi E. André

(Text-figs 10, 11)

Cataulacus huberi E. André, 1890 : 326. Syntype workers, SIERRA LEONE (*A. Mocquerys*) (MNHN, Paris) [examined].

Cataulacus huberi var. *longispinus* Stitz, 1910 : 139, fig. 8. Holotype worker, CAMEROUN: Mundame (*Conradt*) (MNHU, Berlin) [examined]. **Syn. n.**

Cataulacus huberi race *herteri* Forel, 1913*c* : 315. Syntype workers, ZAIRE: Katanga, Welgelegen 14.vi.1912 (*Bequaert*) (MHN, Geneva; MRAC, Tervuren; MNHU, Berlin) [examined]. **Syn. n.**

Cataulacus huberi subsp. *guilelmi* Wheeler, 1925 : 1. Holotype worker, ZAIRE: Ituri (location of type not known). **Syn. n.**

Cataulacus huberi st. *herteri* var. *luebensis* Santschi, 1937*a* : 57. Syntype workers, ZAIRE: Luebo, Kamajembi, 22.ix.1921 (*H. Schouteden*) (NM, Basle) [examined]. [Name not available.]

Worker. TL 5·5 – 7·8, HL 1·22 – 1·74, HW 1·60 – 2·30, CI 127 – 132, EL 0·42 – 0·56, OI 26 – 29, IOD 1·20 – 1·84, SL 0·76 – 1·04, SI 45 – 48, PW 1·28 – 2·10, AL 1·44 – 2·10, MTL 0·86 – 1·24 (10 measured).

Occipital crest usually developed as an unarmed ridge or acute angle separating vertex from occiput. In shape it may be broadly but shallowly concave across the width of the head or more strongly concave in the middle portion than elsewhere. The crest may be reduced or even absent in some smaller members of the species. Occipital corners acute, usually without a posteriorly projecting tooth but with a laterally projecting dentiform angle. Sides of head behind eyes usually denticulate or crenulate, rarely only irregular. Pronotum strongly marginate laterally, the margination either entire or more usually broken up into 1 to 4 separated, projecting dentiform or blunted processes, sometimes the number of these processes different on each side of the same individual. When the margination is entire then the edge is often crenulate or otherwise jagged. Remainder of alitrunk not marginate, without denticles. Propodeum with a pair of long, acute spines. Dorsal surface of petiole flattened, rectangular or subrectangular in shape, the sides of the posterior face converging. Postpetiole strongly transversely expanded, usually distinctly broader than the petiole. Subpetiolar process well developed, variable in shape and size; subpostpetiolar process usually a long, acute tooth. Both the tergite and the sternite of the first gastral segment strongly or very strongly marginate or carinate laterobasally, these structures tending to fade out before reaching the midlength of the segment.

Sculpturation very variable. The head is usually finely and sparsely reticulate-rugose with reticulate-punctate interspaces, more rarely with the rugulations adopting a longitudinal or arcuate direction. On the dorsal alitrunk all intergrades are known between a distinct longitudinal sulcate-rugulation and a finely shagreened surface with one or two weak rugulae. However, the most common form of sculpturation appears to be a very fine and quite dense longitudinal rugulation with the spaces between the rugulae reticulate-punctate. On the anterior portion of the pronotum the rugulae tend to be transverse. Petiole and postpetiole strongly transversely sulcate-rugose. First gastral tergite usually densely reticulate-punctate, often with numerous longitudinal rugulae, especially basally.

Erect hairs absent from dorsal surfaces of head and body, present upon appendages and with a row of distinct short hairs freely projecting laterally beyond the margins of the sides of the head behind the eyes.

Female. TL 8·0, HL 1·70, HW 2·00, CI 116, EL 0·54, OI 27, IOD 1·68, SL not measurable, PW 1·80, AL 2·30, MTL 1·12.

Answering to the description of the worker but the pronotal marginations not so broadly expanded and the rugulation of the mesoscutellum and propodeum strongly transverse. Propodeal spines greatly reduced in length, present here as a pair of broad, blunt teeth. The female may in fact be as variable as the worker, but collections of this caste are extremely scarce.

Male. TL 6·8, HL 1·20, HW 1·42, CI 118, EL 0·40, OI 28, IOD 1·16, SL 0·66, SI 46, PW 1·36, AL 1·94, MTL 1·02.

Occipital crest absent, the occipital corners projecting as broadly triangular processes. Sides of head behind eyes strongly denticulate. Sides of pronotum sharply but narrowly marginate, not expanded as in the worker, nor armed with teeth. Anterior arms of notauli well developed and strongly cross-ribbed, the posterior arm absent. Parapsidal furrows very distinct. Propodeum with a pair of long, acute spines which are very broad basally. Petiole and postpetiole basically similar in shape to that described for the worker, with similar ventral processes. A faint trace of margination is visible on the first gastral tergite in front of the spiracle, and a short weak carina parallels it upon the sternite. Sculpturation is everywhere of a fine, dense reticulate-puncturation with a few scattered rugulae, which form a loose reticulum behind the eyes. The propodeal dorsum is more strongly rugose and the segments of the pedicel show sculpturation similar to, though less well developed than the worker. Short erect hairs are present and distinct upon the dorsal surfaces of the alitrunk and gaster, but are limited to two upon the vertex.

Without a doubt *huberi* is amongst the most variable of species as concerns sculpturation. At the beginning of this survey I had originally separated two of the most extreme forms as distinct species, and it was only with the study of more material, as it was acquired, that it became apparent that only a single species was represented. Although the species is so variable it is nonetheless easily recognizable by its combination of the following characters: pedicellar segments transverse and strongly transversely sculptured; gaster with the first tergite strongly marginate and the first sternite carinate laterobasally; sides of head denticulate or crenulate, with a distinct series of projecting hairs.

The most closely related species, *egenus*, is separated by the characters given in the key. Of the described, and now synonymized infraspecific taxa formerly attached to *huberi*, the majority were based upon sculptural variations, and these immediately fell into the synonymy. In the var. *longispinus*, apart from some sculptural variation, Stitz noted that there were three prothoracic spines on each side and relatively long propodeal spines. The latter are well within the range observed during the present study and as has been noted the number of pronotal spines or teeth may vary from 0 to 4. In fact the race *herteri*, reported by Forel as having no teeth upon the pronotum, has two such processes developed in at least two of the syntype workers in existence.

The specimens of this species collected by the present author were found running upon a moss-covered tree trunk in Ghanaian primary forest. Collections by pyrethrum knock-down in this area (Mt. Atewa) conducted by D. Leston also produced this species.

MATERIAL EXAMINED.

GHANA: Mt. Atewa (*B. Bolton*), (*D. Leston*), (*O. W. Richards*); Mampong (*O. W. Richards*). NIGERIA: Ile-Ife (*J. T. Medler*). UGANDA: no data, 1 specimen. ZAMBIA: N'Changa (*C. T. Macnamara*); Congo Border, Niankasa (*H. S. Evans*). ZAIRE: Ituri, Mt. Hoyo (*E. S. Ross & R. E. Leech*); Lubulu (*L. Burgeon*); Haut Uele, Moto (*L. Burgeon*); Irebu (*H. Schouteden*); Basongo (*H. Schouteden*) Kai Bumba (*H. Schouteden*); Kamaiembi (*H. Schouteden*); Kunungu (*H. Schouteden*); Yangambi (*N. L. H. Krauss*).

Cataulacus inermis Santschi

Cataulacus inermis Santschi, 1924 : 218, fig. 10. Holotype worker, ZAIRE: Kasai, Ngombe, 5.xi.1921 (*H. Schouteden*) (MRAC, Tervuren) [examined].

Worker. TL 6·1, HL 1·50, HW 1·74, CI 116, EL 0·50, OI 29, IOD 1·42, SL 0·84, SI 48, PW 1·60, AL 1·82, MTL 1·00.

Occipital crest not developed medially, the vertex separated from the occiput by a sharp angle. Occipital corners forming a blunt right-angle, without a tooth or denticle. Sides of head behind eyes not denticulate. Pronotum strongly marginate laterally, the margins expanded and quite regular, not denticulate. Remainder of alitrunk not marginate not denticulate, the propodeum without spines or teeth posterodorsally, the dorsum curving without interruption into the declivity. Petiole more or less flat dorsally; the postpetiole divided into two lobes dorsally by a median longitudinal impression. First gastral tergite marginate basally and laterally to the level of the spiracle, behind which the margination peters out.

Dorsal surfaces of head and alitrunk very finely and densely reticulate-punctate. On the head there is some faint rugoreticulation, best developed behind the eyes. Pronotum and mesonotum with sparse, scattered, very faint and predominantly longitudinal rugulae. Propodeal dorsum and declivity distinctly and regularly transversely rugulose. Dorsum of petiole and anterior face of postpetiole strongly, rather coarsely longitudinally sulcate. First gastral tergite finely and very densely reticulate-punctate with a scattered rugoreticulum.

Erect hairs absent from alitrunk and from dorsum of head except for a row running between the eyes and the occipital corners and some upon the frontal carinae. Petiole and postpetiole with sparse, very stout hairs; first gastral tergite without hairs except for a few at the apex.

The structure and sculpturation of the pedicel ally this species very closely with *lobatus*, from which it is separable by its lack of propodeal spines and presence of transverse sculpturation upon the propodeal dorsum. In *lobatus* propodeal spines are present and the sculpturation of the dorsum of the segment is longitudinal where developed.

Cataulacus kohli Mayr

(Text-fig. 8)

Cataulacus kohli Mayr, 1895 : 127, fig. 2. Holotype worker, SIERRA LEONE: N'Gamie River, Samlia Falls (location of type not known).

Cataulacus kohli st. *brazzavillensis* Santschi, 1909 : 389, fig. 14. Syntype workers, male, CONGO (BRAZZAVILLE): Brazzaville (*A. Weiss*) (NM, Basle) [examined]. **Syn. n.**

Cataulacus foveolatus Stitz, 1910 : 140. Holotype worker, EQUATORIAL GUINEA: Uelleburg (*Tessmann*) (MNHU, Berlin) [examined]. **Syn. n.**

Cataulacus latipes Menozzi, 1932 : 106, fig. 4. Syntype workers, UGANDA: Entebbe (*E. Bayon*) (IE, Bologna). **Syn. n.**

Worker. TL 5·1 – 7·1, HL 1·24 – 1·74, HW 1·64 – 2·28, CI 126 – 132, EL 0·48 – 0·60, OI 26 – 29, IOD 1·22 – 1·90, SL 0·74 – 1·04, SI 41 – 45, PW 1·52 – 2·14, AL 1·40 – 2·10, MTL 0·84 – 1·30. (5 measured).

Occipital crest developed as a low but sharp, unarmed ridge running the width of the head and separating vertex from occiput. It is better developed in larger than in smaller workers, and is concave in its median portion. Occipital corners rounded, without teeth or denticles; the sides of the head behind the eyes not denticulate. Alitrunk not denticulate on the lateral margins. Humeral angles of pronotum rounded, not produced into a point; the shape of the pronotal margination somewhat variable but usually with a broad, rounded, subtriangular process anteriorly, subtended by a simple ridge posteriorly. The process is almost a broad and much-flattened tooth in smaller workers but is less well developed in larger individuals. Mesonotum and propodeum not marginate, the latter armed with a pair of long, acute, tapering spines. Dorsum of alitrunk without trace of sutures or with the promesonotal suture faintly indicated. In the largest workers the path of the metanotal groove may be visible, but is always extremely faint and is never impressed. Femora, especially of the hind legs, strongly antero-posteriorly compressed, narrow and very deep. First gastral tergite weakly or not marginate laterally. When margination is distinctive it is strongest basally, petering out well before the apex of the segment.

Sculpturation of dorsum of head capsule usually finely granulose with scattered, superimposed shallow pits or foveolae. Laterally, close to and behind the eyes are some fine rugulations which tend to curve towards the midline of the occipital margin. Rarely, and usually in smaller workers, these rugulae are also present in the centre of the dorsum. Alitrunk, especially the mesonotum and propodeum, finely and densely reticulate-punctate with fine, scattered longitudinal rugulae. Pronotal dorsum more variably sculptured, the rugulae may even run transversely on the anterior portion. Petiole transversely rugose; the anterior face of the postpetiole longitudinally rugose. First gastral tergite finely and densely reticulate-punctate, overlaid by dense, very fine, virtually parallel rugulations which are arranged in a broadly circular or oval pattern around the sclerite or are convergent on the midline anteriorly.

Dorsal surfaces of head, alitrunk and gaster without hairs. Hairs are abundant upon the legs and a row of very short, blunt hairs projects from the lateral margins of the head behind the eyes. Lateral pronotal margins without such a projecting series of short hairs.

This quite distinctive medium-sized species is mostly confined to the rain forest areas of West and Central Africa, but does occur in East African forests. The strongly flattened hind femora, form of sculpturation and lack of dorsally situated hairs coupled with a complete absence of denticles render this species quite easily recognizable.

The name *foveolatus*, used by Stitz to describe this species, really only applies to the sculpturation of the dorsum of the head capsule, but this sculpturation is not more strongly defined in his specimen than is usual in the species. The name *latipes* laid emphasis upon the strongly expanded hind femora which are characteristic of the species. As Menozzi noted that the species was 'unique' and was separable from all other species by the 'special sculpture of the body and the much-dilated femora', it seems reasonable to assume that he was not acquainted with either Mayr's original description or Stitz's later description of the species. Menozzi's characterization and figures of the worker make the synonymy certain.

MATERIAL EXAMINED.

CAMEROUN: Okola (*C. A. Collingwood*); Nkolbisson (*B. de Miré*). ZAIRE: Haut Uele, Watsa (*L. Burgeon*); Haut Uele, Moto (*L. Burgeon*); Basongo (*H. Schouteden*); Kasai, Ngombe (*H. Schouteden*); Kunungu (*H. Schouteden*); Luebo (*H. Schouteden*); Ilenge (*R. Mayné*); Mongende (*H. Schouteden*); Kidada, Kitobola (*H. Schouteden*); Eala (*H. Schouteden*); Bali (*Christy*); Ituri, La Moto, Madyu (*L. Burgeon*); Yangambi (*N. L. H. Krauss*).

Cataulacus lobatus Mayr

(Text-fig. 9)

Cataulacus lobatus Mayr, 1895 : 126, fig. 1. Holotype worker, CAMEROUN: Kriegsschiffhafen, 15.iii.1892 (*Brauns*) (MN, Vienna) [examined].

Note: the holotype is badly damaged, with both the head and the gaster missing.

Worker. TL 6·1, HL 1·52, HW 1·76, CI 116, EL 0·48, OI 27, IOD 1·46, SL 0·88, SI 57, PW 1·56, AL 1·80, MTL 1·04.

Occipital crest developed at each side but almost obliterated medially, visible only from certain angles, shallowly concave, unarmed. Occipital corners acute, almost right-angular but without differentiated teeth or denticles. Sides of head behind eyes irregular but not denticulate. Pronotum marginate, the margins expanded laterally but without teeth or denticles. Remainder of alitrunk not marginate, without denticles. Track of promesonotal suture represented upon the dorsal alitrunk by an extremely faint impression. Propodeum with a pair of short, narrow but acute spines. Petiole in dorsal view distinctly longer than broad; postpetiole divided into a pair of lobes dorsally by a longitudinal median impression. Sides of first gastral tergite marginate to the level of the spiracle; the margination most acute basally, rapidly becoming more obtuse nearer the spiracle itself.

Dorsum of head behind clypeus very finely reticulate-punctate with a faint, loose overlying rugoreticulum. The latter is strongest and most distinct behind the eyes but is very much effaced medially, in places virtually absent. Dorsal alitrunk similarly sculptured, the punctuation more marked than upon the head, and the sides of the propodeal dorsum with a few longitudinal rugae converging upon the bases of the spines. Propodeal declivity strongly transversely rugose throughout its depth. Dorsal surfaces of petiole and postpetiole coarsely longitudinally sulcate-rugose. First gastral tergite strongly reticulate-punctate with a few short rugulae.

Erect hairs absent from dorsal surfaces of head, alitrunk and gaster; present on the lateral margins of the head and the appendages.

C. inermis is the closest related species to *lobatus*, but the former lacks propodeal spines and has distinctive transverse sculpturation upon the propodeal dorsum as well as the declivity.

MATERIAL EXAMINED.

ZAIRE: Mulubule (*J. Bequaert*).

Cataulacus oberthueri Emery

(Text-fig. 7)

Cataulacus oberthüri Emery, *in* Forel, 1891*a* : 146, pl. 4, fig. 9. Syntype workers, MADAGASCAR: Tamatave and Alaha Kato (*E. Perrot*) (MRAC, Tervuren) [examined].

Cataulacus oberthueri Emery; Emery, 1899 : 186 [emended spelling].

Worker. TL 10·8, HL 2·48, HW 2·76, CI 111, EL 0·60, OI 21, IOD 1·74, SL 1·54, SI 56, PW 1·84, AL 3·2, MTL ca 1·90.

Occipital corners extended posteriorly into a very broadly triangular, acute prominence on each side. In profile these projections are seen to be slightly upcurved. Occipital crest unarmed, incomplete medially where the vertex rounds smoothly into the occiput, but laterally the crest is strongly developed, somewhat translucent, and forming a strong inner border to the occipital prominences. Sides of the head behind eyes not denticulate, the actual margin of the head in full-face view semi-translucent between the posterior margin of the eye and the apex of the prominence at the occipital corner. Preocular teeth absent. Pronotum with a weakly developed, transverse ridge anteriorly, and virtually non-existant lateral margination, the latter represented only by an obtuse angle, best seen on the posterior half of the segment. Remainder of alitrunk not marginate; the entirety of the alitrunk without denticles, spines or lobiform prominences laterally. Propodeum with a pair of long, tapering, acute spines. Track of promesonotal suture indicated by a very shallow, faint impression upon the dorsum. Petiole and postpetiole in profile with low, rounded nodes, paniform, each with a short, spiniform ventral process anteriorly. First gastral tergite without margination.

Dorsal surfaces of head, alitrunk and pedicel finely shagreened throughout with some sparse, fine, longitudinal rugation, especially visible and strongest developed upon the head and the propodeal dorsum. First gastral tergite superficially extremely finely and densely reticulate, dully shining.

Upon the dorsal surfaces of the body stout hairs are present only on the frontal carinae, pedicel and apex of first gastral tergite; they are, however, numerous upon the appendages.

This species is characterized by its large size, relatively very small eyes and its reduction or loss of numerous 'typically cataulacine' features. The remarkably developed occipital corners led Forel (1891*a* : 147) to place *oberthueri* in a separate subgenus *Otomyrmex*. now synonymized (see above, p. 7).

The species appears to be related to two other Madagascan species, *regularis* and *porcatus* and these, with the possible inclusion of *wasmanni*, seem to represent a more ancient radiation upon the island. It should be noted that specialization in these species has been accomplished by a reduction of characters considered typical of the genus as a whole, and this tendency reaches its strongest development in *oberthueri*. The entirety of the head and alitrunk is devoid of denticulation and almost devoid of standing hairs; the margination of the alitrunk is reduced almost to nothing, with only a vestige remaining on the pronotum; and sculpturation everywhere is strongly reduced. Preocular teeth are absent and the posterior portions of the antennal scrobes are very poorly developed.

The species is apparently rare, only being known from the forested areas in the vicinity of Tamatave on the east coast of Madagascar, and from a locality thirty miles to the north-west of this town.

Cataulacus porcatus Emery

Cataulacus porcatus Emery, 1899 : 286. Syntype worker, female, MADAGASCAR: Antongil Bay, 1897–98 (*Mocquerys*) (probably in MCSN, Genoa).

I have not been able to examine the types of this interesting species and as far as can be ascertained the type collection represents the only known specimens. However, Emery's description is good and the species appears to be valid. The short characterization given below is summarized from the original description.

Worker. TL 3·5 – 4·5.

Occipital corners with two small, obtuse teeth each and the occipital crest apparently absent. Preocular teeth present. Dorsal surface of head strongly convex so that the large eyes are more or less lateral; antennal scrobes strongly deflected in their posterior portions. Alitrunk marginate; the pronotal margination with two subrectangular teeth anteriorly, separated by an incision. Behind this the margin is feebly sinuate and terminates in a broad, rounded projection. Mesonotum separated from propodeum by a tooth and an incision laterally. Propodeum furnished with a pair of short spines. Promesonotal suture effaced, metanotal groove a faint sulcus which does not break the sculpturation. Petiole with a small tooth in the middle of its upper sides.

Head, alitrunk and segments of pedicel with strongly undulate, longitudinal sulcate-rugation; with only 12–13 present across the posterior portion of the mesonotum. Sculpturation of head finer than that of alitrunk and some rugae are convergent towards a point on the midline situated on a level with the anterior margins of the eyes. Gaster finely punctate and with fine, longitudinal rugae.

A few short, clavate hairs present upon the alitrunk and legs.

Emery states that the species is close to *regularis*, and from the description this certainly appears to be the case. In particular his description of the alitrunk and sculpturation are reminiscent of *regularis* (Text-fig. 14), but as he points out there are noticeable differences in the sculpturation, and also *regularis* has the occipital corners unarmed. In view of this it is probably correct to retain *porcatus* as a species, at least until the types can be examined or until more material assignable to the species is forthcoming.

Cataulacus pullus Santschi

(Text-fig. 12)

Cataulacus pullus Santschi, 1910*a* : 387, fig. 13. Holotype worker, CONGO (BRAZZAVILLE): Brazzaville (*A. Weiss*) (NM, Basle) [examined].

Cataulacus coriaceus Stitz, 1910 : 138, fig. 7. Holotype worker, CAMEROUN: Mundame (*Conradt*) (MNHU, Berlin) [examined]. **Syn. n.**

Cataulacus pullus var. *orientalis* Santschi, 1914*b* : 108. Holotype worker, KENYA: Voi, alt. 600 m, st. no. 60, iii. 1912 (*Alluaud & Jeannel*) (NM, Basle) [examined]. **Syn. n.**

Worker. TL 5·3–7·0, HL 1·32–1·84, HW 1·58–2·16, CI 117–119, EL 0·42–0·54, OI 25–28, IOD 1·18–1·70, SL 0·80–1·02, SI 49–53, PW 1·24–1·60, AL 1·60–2·04, MTL 0·90–20 (3 measured).

Occipital crest absent, the vertex curving into the occipital surface which is shallowly concave in larger workers. Occipital corners with a single, broad triangular or subtriangular denticle or tooth, which is usually continued towards the midline as a short, sharp ridge. Sides of head between eyes and occipital corners denticulate or crenulate or merely irregular in largest workers. Pronotum marginate laterally, the remainder of the alitrunk not marginate, the dorsum curving into the sides. On the pronotum the margination is expanded laterally, beginning just behind the acute humeral angles, and usually bears two teeth. The anterior of these two teeth is larger and is separated by a distinct gap from the posterior teeth; this latter is situated towards the posteriormost point of the pronotal margination, which peters out before the junction with the mesonotum. Promesonotal suture absent or its track marked by an extremely faint impression, showing its former position. Propodeum with a pair of long, acute slightly divergent spines. Ventral processes of petiole and postpetiole well developed, the former usually showing a well developed posteroventral tooth or spur; the latter short, spiniform or dentiform. First gastral tergite not marginate laterally.

Dorsum of head extremely finely, densely and shallowly reticulate-punctate, dully shining; the whole surface except the clypeus overlaid by a fine, loose, disorganised rugoreticulum. Pronotum, especially on anterior half, sculptured as head, but on the remainder of the dorsal alitrunk the rugulae tend to take on a distinct longitudinal trend. In smaller workers the rugulae may be reduced or absent on the mesonotum, leaving the sclerite merely reticulate-punctate. Petiole and postpetiole coarsely rugose, the rugae often directed longitudinally upon the former. First gastral tergite reticulate-punctate or also with a fine rugoreticulum.

Erect hairs absent from dorsal surfaces of head behind clypeus and dorsum of alitrunk, present upon clypeus, lateral margins of head, pedicel, appendages, and usually also on first gastral tergite.

The variety *orientalis* was based on very slight differences of sculpturation and form of propodeal spines from the type of *pullus*. Stitz's species *coriaceus* is the 'large form' of worker which is now known to occur in most species of this group, occasionally with marked differences in structure or sculpturation. It is possible that the description of *coriaceus* was already in press when Santschi published *pullus*, as Stitz does not appear to have been acquainted with this latter paper.

The species is perhaps best distinguished by the characters used to separate it in the key. In the specimens so far examined the structure of the pronotal margination has been reasonably consistent; but in view of the variability of this region in closely related species (*huberi*, etc.) it is to be expected that specimens will eventually be found which differ in this respect from the above description.

MATERIAL EXAMINED.

ZAIRE: Irebu (*H. Schouteden*), Lukolela to Basoko (*H. O. Lang*).

Cataulacus regularis Forel
(Text-fig. 14)

Cataulacus regularis Forel, 1891*b* : 252. Syntype workers, MADAGASCAR: Bezanozano, Anosibé (*Sikora*) (MHN, Geneva) [examined].

Worker. TL 5·3 – 5·9, HL 1·22 – 1·32, HW 1·30 – 1·32, CI 100 – 107, EL 0·42 – 0·46, OI 32 – 35, IOD 1·04 – 1·06, SL 0·68 – 0·72, SI 52 – 54, PW 1·10 – 1·18, AL ca 1·68, MTL 0·66 – 0·70 (2 measured).

Lateral portions of occipital crest developed, unarmed. Medially the crest is very poorly developed, concave or broadly V-shaped in full-face view. Sides of head behind eyes smooth, not denticulate. Occipital corners irregular or with one or two obtuse, low prominences, not armed with teeth or spines. Sides of alitrunk without denticles. Humeral angles acute, separated by a short but marked concavity from the beginnings of the pronotal margination; the latter joining the mesonotum at a slight notch. Promesonotal suture visible as an impression across the sculpturation but not breaking it. Mesonotal margination ending in a triangular, dentiform process posteriorly, in front of a distinct notch separating mesonotum from propodeum. Propodeal marginations strongly convex anteriorly, converging behind to a pair of short, narrow, virtually parallel spines. Petiole longer than broad in dorsal view, with a small but distinct laterally projecting tooth at about the midlength on either side. In profile the petiole somewhat flattened, with a steep anterior face and a long, somewhat sloping dorsal face; without a differentiated free posterior surface before the junction with the postpetiole. Subpetiolar process complex, with a tooth posteroventrally. Anterior subpostpetiolar process variable in size but simple. Sides of postpetiole in dorsal view with one or two denticles. Gaster not marginate laterally.

Dorsal surfaces of head behind clypeus, alitrunk, petiole and postpetiole strongly sculptured with regular, parallel longitudinal sulci, the spaces between the sulci broadly convex and giving the cuticle a ploughed appearance. The pronotal sulci are slightly wavy in the larger specimen examined, much more regularly organized in the smaller. First gastral tergite finely reticulate-punctate with a few scattered, fine, longitudinal rugulae. Clypeus sculptured much as rest of head but more finely so, and with a tendency for the sulci to fade out anteriorly.

Dorsal surfaces of head and alitrunk and margins of alitrunk without hairs. Short hairs are present upon the petiole, postpetiole, apex of first gastral tergite and margins of frontal carinae; appendages with numerous short, erect hairs.

This very distinctively shaped and sculptured species is apparently known only from the type collection made in Madagascar. In the original description Forel records that Anosibé is three days journey east-south-east of Antananarivo. The sculpturation seen in this species is very uncommon, being met with only in one other Madagascan species, the seemingly closely related *porcatus*. This latter species is, however, smaller and has some erect hairs on the dorsal alitrunk, besides differences in sculpturation. In species of other groups in which at least the alitrunk is longitudinally sulcate there are other marked differences, most obvious amongst which are presence of hairs or denticles or both upon the alitrunk, and marked differences in the shape of this portion of the body.

Cataulacus tardus Santschi
(Text-fig. 13)

Cataulacus tardus Santschi, 1914*c* : 372, fig. 33. Holotype worker, GUINEA: Mamou, 24.viii.1912 (*Silvestri*) (NM, Basle) [examined].

Cataulacus schoutedeni Santschi, 1919*b* : 248. Syntype workers, female, ZAIRE: Congo da Lemba, i–ii.1913 (*R. Mayné*) (NM, Basle; MRAC, Tervuren) [examined]. **Syn. n.**

Worker. TL 5·4 – 6·8, HL 1·40 – 1·70, HW 1·58 – 1·96, CI 113 – 117, EL 0·44 – 0·54, IO 22 – 28, IOD 1·20 – 1·48, SL 0·84 – 0·98, SI 50 – 51, PW 1·24 – 1·56, AL 1·54 – 1·86, MTL 0·88 – 0·94 (7 measured).

Occipital margin usually without crest separating vertex from occiput, the two surfaces confluent; but in some large workers an acute angle separates the two surfaces. Occipital corners without teeth or denticles, rounded; the sides of the head behind the eyes often irregular but never denticulate. Margins of alitrunk not denticulate; the pronotum strongly marginate, the remainder not marginate, with the dorsum rounding evenly into the sides. Pronotal margination expanded laterally, subrectangular in shape, the edges straight or irregular and strongly converging posteriorly to the mesonotal surface. Promesonotal suture absent or represented in the largest workers by a very faint and extremely shallow arcuate impression. Propodeum with a pair of long, strong, acute spines, as long as or longer than the dorsal length of the petiole. First gastral tergite not marginate.

Dorsum of head extremely finely, densely and faintly reticulate-punctate, with a loose, very fine, scattered rugoreticulum. In some specimens the rugulation is effaced or nearly so over some areas of the cephalic dorsum. Dorsal alitrunk similarly sculptured but with the rugulae tending to assume a longitudinal direction. First gastral tergite predominantly or totally finely reticulate-punctate, but in some specimens a few very faint rugulae are visible.

Dorsal surfaces of head, alitrunk and gaster without hairs. Margins of head behind eyes and margins of alitrunk without hairs, or the former with one or two minute hairs which, however, do not project freely beyond the margin.

The syntype female of *schoutedeni* described by Santschi (1919*b* : 249) has not been examined during the course of this study but from the rather short description it does not appear to differ significantly from the worker. The sculpturation is noted as being rather more coarse and the head as being slightly longer. TL is given as 6 mm.

Santschi notes that *schoutedeni* is close to *tardus*, but 'is smaller, the (propodeal) spines relatively longer, the sculpture more feeble'. Variations of this form are usual and may be universal amongst species of the *huberi* group, and the only real difference separating the types of the two forms in the present species (apart from obvious size differences) is the presence of an angle separating the vertex from the occiput in *tardus*, absent from *schoutedeni*. As has been noted the occurrence of this angle is restricted to large workers of the species and no grounds remain for maintaining the two names as separate species.

MATERIAL EXAMINED.

GHANA: Tafo (*C. A Collingwood*); S. Fomang (*D. Leston*); Osiem (?). ZAIRE: Kwamouth (*H. Schouteden*); Kunungu (*H. Schouteden*); Temvo (*H. Schouteden*); Mayumbe, Makaia Ntete (*H. Schouteden*).

Cataulacus theobromicolus Santschi

Cataulacus theobromicolus Santschi, 1939*a* : 8, fig. 2. Holotype worker, ZAIRE: Gazi, in cocoa tree, xii. 1937 (*Beinaert*) (location of type not known).

The short diagnostic notes below are adapted from the original description.

Worker. TL 6·5, CI 118, OI 27 (CI and OI are approximated from the figure accompanying the original description).

Occipital corners with a single tooth; the occipital margin not denticulate and apparently without an occipital crest of any form. Sides of head behind eyes crenulate posteriorly, close to the corners. Pronotum marginate laterally, the anterior and posterior angles of the margins acute but not projecting. Pronotal margins without denticles but with a single triangular tooth in the anterior halves of their lengths. Mesonotum and propodeum not marginate, without denticles. Promesonotal suture and metanotal groove feebly marked by impressions. Propodeal spines short but acute.

Entirety of head and body dorsally finely reticulate-punctate, the head and alitrunk with a fine rugoreticulum which is finer and denser upon the alitrunk than upon the head. Petiole dorsally very coarsely longitudinally rugose. Sides of head behind eyes with a row of laterally projecting short, stout hairs. Hairs absent from dorsum of head and alitrunk; present around mouth and at apex of gaster.

The overall impression obtained from Santschi's description and figure is of a species closely related to *pullus* but separated from it by the structure of the lateral pronotal margins and the relative shortness of the propodeal spines.

Cataulacus wasmanni Forel

Cataulacus (*Otomyrmex*) *wasmanni* Forel, 1897 : 193. Holotype worker, MADAGASCAR: Isle Ste. Marie, Kalalo (location of type not known).

I have not been able to locate the type of this species but the original description is sufficiently detailed to allow its recognition as a good species. This description is in part reproduced below, the arrangement somewhat altered to fit the format used in the present paper.

Worker. TL 5·3.

Occipital crest developed. Occipital corners with short, fairly small, triangular, ear-shaped points. Eyes very large, flat. Sides of head behind eyes apparently not denticulate. Preocular tooth present. In profile the dorsal outline of the alitrunk hemispherically arched. Pronotum marginate, not denticulate, the margin sharp, horizontal and leaf-like. Mesonotum and propodeum with a horizontal, broad, short thorn or strong tooth. Promesonotal suture indicated by an impression. Propodeum with a pair of very long, acute, divergent spines, which are half as long as the entire alitrunk. Gaster short, elliptical, almost round in dorsal view.

Head densely and coarsely, regularly longitudinally rugose dorsally. Occipital surface behind the crest transversely rugose. Pronotum coarsely, densely longitudinally striate; the mesonotum similarly but very regularly striate. Propodeal dorsum transversely striate, the sides longitudinally so; similarly the segments of the pedicel. Gaster reticulate-punctate with fine but not dense longitudinal striation. Hairs absent from the dorsal surfaces of the head and body, present on the appendages, the anterior portion of the head and mandibles, and the gastral apex.

The description of the sculpturation and form of the alitrunk seems to ally this species to *oberthueri* and its allies, particularly to *regularis*. It should be easily recognizable as it is the only Madagascan species on record in which the direction of sculpturation differs on the propodeum from that on the mesonotum. This arrangement of sculpture is known from two species of the Ethiopian region, namely *inermis* and *pilosus*, but in the first of these the propodeum lacks spines, whilst the second is densely hairy.

The *TENUIS*-Group

Small to minute species, TL usually less than 4·0, rarely slightly more; measured range o TL 2·7 – 4·4, the latter occurring only in large workers of *elongatus*. Slender, narrowly built forms with HW < 1·0, often <0·90 and with PW < 0·80. The head is always longer than broad, CI < 100 and in most cases less than 95. Eyes relatively large or enormous, OI usually >50, always 49 or more except in *elongatus* where one worker measured had OI 45.

Hairs are invariably present on the dorsal surfaces of the head, body and appendages. These hairs are usually short, stout and simple but in some species they are variously modified; for instance at least the cephalic hairs may be clavate (*brevisetosus*, *vorticus*), or long and sinuate (*elongatus*), or short, simple and very strongly adpressed (*adpressus*). The pronotum is marginate laterally, the sides usually almost parallel, and in most species the margins are serially denticulate. The propodeal spines are usually short and acute, not uncommonly somewhat dorsoventrally flattened. Sculpturation in the group is basically of a rugoreticulum with reticulate-punctate interspaces, but numerous species have longitudinal rugulation or sulcation, at least in part.

This group of ten species includes all the small, narrowly-built, large-eyed forms with elongate heads. They are very closely related to the *intrudens*-group, from which they may eventually be found to be inseparable.

The common species *pygmaeus* apparently forms a link between the two groups but on weighing the characters which it possesses it falls in with *intrudens* rather than with the relatives of *tenuis*. However, as it resembles the members of the present group so closely and as one of the species included in this group was originally described as an infraspecific form of *pygmaeus*, separatory notes and comments are included under some of the species.

The majority of species in the present group are forest-dwelling forms but *brevisetosus* seems able to survive in any area of Africa in which conditions are not too inimical. Only a single species of the group, *tenuis* itself, is found in Madagascar.

Cataulacus adpressus **sp. n.**

(Text-figs 15, 18)

Holotype worker. TL 3·5, HL 0·90, HW 0·82, CI 91, EL 0·44, OI 54, IOD 0·58, SL ca 0·42, SI ca 50, PW 0·69, AL 0·90, MTL 0·44.

Occipital crest absent; occipital corners each armed with a single low, blunt denticle. Sides of head behind eyes uneven but not denticulate, convergent close to the occipital corners. Preocular tooth small, separated from the eye by a small gap. Pronotum marginate laterally, the humeral angles acute; margination with a number of extremely minute denticles and terminating posteriorly in a single larger denticle close to the promesonotal junction. Mesonotum and propodeum not marginate, without denticles; propodeal spines short and bluntly rounded apically. Promesonotal suture represented upon the dorsum by a very weak impression which does not break the sculpturation and is best visible at the sides where it joins a small, shallow notch separating the pro- and mesonota. Metanotal groove absent. Sides of pronotum in dorsal view more or less parallel, only very slightly convergent posteriorly; those of the mesonotum shallowly convex and convergent posteriorly, separated from the propodeum by a shallow, very broadly V-shaped impression. Propodeal sides with a bluntly convex swelling anteriorly, converging behind to the bases of the spines. First gastral tergite not marginate laterally.

Dorsum of head finely reticulate-rugose, the interspaces finely and densely reticulate-punctate. Dorsum of alitrunk finely regularly longitudinally sulcate with a few transverse sulci between the propodeal spines. Sides of alitrunk obliquely sulcate, those on the propodeum almost vertical. Femora longitudinally sulcate. Anterior surface of petiole and posterior surfaces of both petiole and postpetiole transversely sulcate, but the anterior and dorsal faces of the latter longitudinally so. First gastral tergite with fine, dense longitudinal rugulae throughout its length.

Hairs on all dorsal surfaces of the body from the clypeus to the apex of the first gastral tergite strongly adpressed, sparse, most easily visible upon the clypeus, propodum, postpetiole and gaster. Normal standing hairs present only upon the mandibles, margins of the frontal carinae and extreme gastral apex. A few strongly adpressed hairs present upon the dorsal surfaces of the femora.

Holotype worker, GHANA: Bunso (eastern region), 8.vii.1969, by pyrethrum knockdown (*D. Leston*) (BMNH).

The combined characters of size, sculpturation, and the remarkable adpressed hairs immediately identify this species and serve to separate it from the other species related to *brevisetosus*.

Cataulacus brevisetosus Forel

(Text-figs 3, 17, 20)

Cataulacus brevisetosus Forel, 1901*b* : 305. Holotype worker, ANGOLA: Mossamedes, Cubango-Cuito (location of type not known).

Cataulacus lujae Forel, 1911*a* : 311. Syntype workers, ZAIRE: Kasai, Kondue (*Luja*) (MRAC, Tervuren) [examined]. **Syn. n.**

Cataulacus lujae var. *gilviventris* Forel, 1913*c* : 316. Holotype female, ZAIRE: Kabanza, Kikondja, Riv. Lovoi (*Bequaert*) (MRAC, Tervuren) [examined]. **Syn. n.**

Cataulacus jeanneli Santschi, 1914*b* : 108, fig. 16. Holotype worker, KENYA: Gazi, 20 km south of Mombasa (st. no. 6), xi. 1911 (*Alluaud & Jeannel*) (NM, Basle) [examined]. **Syn. n.**

Cataulacus pygmaeus st. *degener* Santschi, 1916 : 507. Holotype worker, ANGOLA: Loanda, 14.i.1913 (NM, Basle) [examined]. **Syn. n.**

Cataulacus pygmaeus st. *lujae* var. *plebeja* Santschi, 1916 : 508. Syntype workers, RHODESIA: Bulawayo, ix. 1914 (*G. Arnold*) (NM, Basle) [examined]. [Name not available.]

Cataulacus janneli (sic) var. *loveridgei* Santschi, 1926 : 244. Holotype worker, TANZANIA: Morogoro, 21.xi.1917 (*A. Loveridge*) (location of type not known). **Syn. n.**

Cataulacus meduseus Santschi, 1939*b* : 245. Holotype worker, SOUTH AFRICA: Natal, Durban, 24.i.1917 (*C. P. Merve*) (possibly in NMR, Bulawayo). **Syn. n.**

Worker. TL 2·7 – 4·0, HL 0·76 – 1·08, HW 0·68 – 0·98, CI 86 – 95, EL 0·36 – 0·48, OI 49 – 54, IOD 0·50 – 0·72, SL 0·36 – 0·50, SI 51 – 53, PW 0·54 – 0·78, AL 0·74– 1·10, MTL 0·38 – 0·52 (20 measured).

Occipital crest absent, the vertex rounding into the occiput or separated from it by an obtuse angle. Occipital corners denticulate and a second denticle present on the occipital margin close to the corner. Sides of head behind eyes minutely denticulate in most, but in some individuals the denticles are reduced or absent. Alitrunk marginate laterally, the margination most pronounced upon the pronotum. Pronotal margins with a row of small or minute denticles, a few of which are also present upon the mesonotal and propodeal margins and may occasionally be present on the outer borders of the propodeal spines; the latter short but distinct. Dorsal alitrunk without trace of sutures. Subpetiolar process simple or with an acute posteroventral angle which may very rarely project as a short tooth. Subpostpetiolar process simple, projecting ventrally as a short blunt spine and usually about half the length of the subpetiolar process. Gaster not marginate laterally.

Dorsum of head and pronotum finely and densely reticulate-rugose with densely reticulate-punctate interspaces. Remainder of dorsal alitrunk similarly sculptured or the rugulae tending to take a longitudinal direction. More rarely the rugulae are reduced upon the mesonotum and propodeal dorsum. Dorsal surface of petiole and also usually of the postpetiole longitudinally rugose. First gastral tergite finely and densely reticulate-punctate everywhere or with sparse longitudinal rugulae present at the base of the gaster only.

Hairs on the clypeus and usually also upon the remainder of the cephalic dorsum bizarre, short and stout and either strongly clavate or stalked-suborbicular, more rarely rather spatulate. In some cases the hairs may be strongly clavate anteriorly upon the head but more or less simple posteriorly. Hairs on remainder of body numerous, short and stout but simple.

Female. TL 4·6 – 5·0, HL 1·04 – 1·10, HW 0·92 – 0·96, CI 87 – 90, EL 0·46, OI 48 – 50, IOD 0·70 – 0·74, SL 0·48 – 0·52, SI 52 – 54, PW 0·86 – 0·90, AL 1·40 – 1·42, MTL 0·48 – 0·54 (3 measured).

As worker but with the expected modification of the alitrunk for flight. Sculpturation of mesoscutum and scutellum of fine, longitudinal rugulation and strong reticulate-puncturation. Propodeal dorsum rather more coarsely rugose than in worker, the spines shorter.

The interrelationships and the constituent species of the complex centring on *brevisetosus* are difficult to decide owing to the great variation in details of sculpturation and shape met with in individuals. The great majority of the forms included in the above synonymy were originally separated from one another only on minor details of head shape, petiole node shape, lengths of propodeal spines and variation in size, all of which characters are very variable, often between individuals of the same colony. Workers from each end of the size range of a series collected at Adeiso, Ghana by D. Leston would earlier this century probably have been described as separate varieties or subspecies if collected singly. The size range between the largest and smallest workers in this series is HL 0·76 – 1·00, HW 0·68 – 0·90, (CI 89 – 90), EL 0·36 – 0·44, (OI 49 – 51), PW 0·54 – 0·70, AL 0·74 – 1·04; coupled with which are some variations in sculpturation and in shape. Because of this variability it is probable that some very closely related forms may be present in the species now called *brevisetosus*, but which are not recognizable as separate as the amount of material available at present is not great enough to show up any consistent characters which they may have. A reassessment of all the forms now placed in *brevisetosus* at some future date when more material is available may show the species to be in actuality a complex of very closely related but distinct forms.

The close relationship of many of the forms of the *brevisetosus* complex was recognized by most earlier workers, in fact Forel (1915 : 220) placed his own species *lujae* as a subspecies of *brevisetosus*, a move with which Arnold (1917 : 397) seemed to agree. On the other hand Santschi (1916 : 506–508) attempted to resolve the problematical forms by placing them all as infraspecific forms of *pygmaeus*. The present study indicates that this was not justifiable, and of the names given as stirps, races and varieties of *pygmaeus*, namely *difficilis*, *lujae*, *plebeja*, *weissi*, *degener*, *jeanneli* and *brevisetosus* the first, fourth and last are now treated as good species whilst the remainder have been placed in the synonymy of the last. Arnold (1917 : 396) pointed out that the differences used to separate *plebeja* were slight and came within the limits of variation to be found in a single nest.

There is a possibility that some specimens of *pygmaeus* may be confused with *brevisetosus* as the clypeal and cephalic hairs in the former are occasionally thickened from base to apex and under low magnification may appear clavate. In these cases the identity of the specimen may be confirmed by mensurable characters, as the head in *pygmaeus* is usually broader (CI 94 – 97) than in specimens of *brevisetosus* with approximately similar head length, whilst the eyes are always relatively smaller, OI 41 – 46, as opposed to OI 49 – 54 in *brevisetosus*. Other absolute measurements will also give an indication of identity as only the largest *brevisetosus* individuals overlap the smallest *pygmaeus* workers in size. Also, the rugoreticulum on the pronotal dorsum is usually more coarse and more widely spaced in *pygmaeus* and the interspaces of this sculpturation tend to be less strongly punctate and are usually distinctly glossy.

Arnold (1917 : 398) records this species nesting in hollow twigs of an acacia. The species has also been noted by the present author nesting in hollow twigs of cocoa in both Nigeria and Ghana, and in the former nests are also made in twigs on small shrubs as well as high up in larger trees.

MATERIAL EXAMINED.

LIBERIA: Monrovia (?). GHANA: Pankese (*C. A. Collingwood*); Akosombo (*C. A. Collingwood*); Domfen (*C. A. Collingwood*); Tafo (*B. Bolton*); Mampong (*D. Leston*); Legon (*D. Leston*); Enchi (*D. Leston*). NIGERIA: Gambari (*B. Bolton*); Araromi (?). ZAIRE: Barumbu (*Bequaert*); Eala (*Couteaux*); Tshela (*E. S. Ross* and *R. E. Leech*). KENYA: Kibwesi (*E. S. Ross*). RHODESIA: Bulawayo (*G. Arnold*); Salisbury (*G. Arnold*). SOUTH AFRICA: Magalieskraal (*Lingnau*); Kimberley (*Power*).

Cataulacus difficilis Santschi **stat. n.**

Cataulacus pygmaeus st. *difficilis* Santschi, 1916 : 506. Holotype worker, DAHOMEY (*Desanti*) (NM, Basle) [examined].

Worker. TL 3·3, HL 0·86, HW 0·78, CI 91, EL 0·42, OI 54, IOD 0·58, SL ·44, SI 56, PW 0·64, AL 0·90, MTL not measurable.

Occipital crest absent; occipital corners each with a pair of small but acute, triangular teeth, one situated at the corner itself, the second just internal to it upon the occipital margin. Sides of head behind the large eyes relatively short but strongly denticulate. Sides of pronotum marginate, strongly denticulate, the remainder of the alitrunk more weakly and sparsely denticulate. Propodeum with a pair of short, acute, divergent spines. Dorsal alitrunk without trace of sutures. Mesokatepisternal tooth strongly developed, triangular, acute and projecting distinctly when the alitrunk is viewed from above. Subpostpetiolar process long and digitiform (subpetiolar process obscured by glue on type). First gastral tergite not marginate laterally.

Dorsum of head finely and shallowly recticulate-rugose, the rugae becoming longitudinal anteriorly. The interspaces of the rugoreticulum sparsely and very shallowly reticulate-punctate, shining, in places the puncturation almost effaced. Pronotal dorsum similarly sculptured but on the mesonotum and propodeal dorsum the cross-meshes are lost, so that the rugae run longitudinally. First gastral tergite strongly and rather coarsely reticulate-punctate, much more strongly so than the head or dorsal alitrunk.

Stout, blunt, erect hairs present upon all dorsal surfaces, simple, relatively long and most abundant upon the head.

Santschi originally associated this species with *pygmaeus*, but the development of the mesokatepisternal tooth in the type (and only known) worker quickly separates this form. In proportion to the overall size of the individual this tooth is almost as well developed as in the better known species *micans*. Furthermore, the dimensions and characteristics of the species show it to be more closely related to *brevisetosus* than to *pygmaeus*.

Cataulacus elongatus Santschi

Cataulacus elongatus Santschi, 1924 : 221. Holotype worker, ANGOLA: Loanda (*Le Moult*) (NM, Basle) [examined].

Worker. TL 3·7 – 4·4, HL 1·00 – 1·10, HW 0·92 – 0·98, CI 89 – 92, EL 0·42 – 0·48, OI 45 – 49, IOD 0·68 – 0·74, SL 0·54 – 0·60, SI 58 – 61, PW 0·60 – 0·72, AL 1·00 – 1·12, MTL 0·52 – 0·58 (4 measured).

Occipital crest absent; occipital corners with a small tooth or denticle and with a second denticle on the border, close to the first. Sides of head behind eyes irregular or crenulate, but not distinctly denticulate. Development of preocular tooth variable, usually distinct but may be reduced. Sides of pronotum virtually parallel, minutely denticulate behind the acute humeral angles. Sides of alitrunk convergent behind the pronotum, often irregular but not denticulate, the mesonotum not marginate. Dorsum of alitrunk without sutures; propodeum armed with a pair of short spines. First gastral tergite not marginate laterally.

Dorsum of head with a fine, loose rugoreticulum, the interspaces of which are shallowly and weakly reticulate-punctate and shining. Dorsum of alitrunk with numerous fine, dense, rounded longitudinal rugae, almost sulcate in appearance; this sculpturation more irregular on the pronotum than elsewhere. Dorsum of petiole regularly, transversely arched-rugulose, the anterior face of the segment with a few weak transverse rugules. Posterior face of postpetiole as petiole, the dorsum rather more coarsely longitudinally rugose. First gastral tergite predominantly finely and densely reticulate-punctate, but with numerous fine or very fine irregular longitudinal rugulae.

All dorsal surfaces of head, body and appendages with abundant fine, long, narrow hairs which are usually curved or sinuate. Hairs on the vertex tend to curve forwards whilst those on the rest of the body are predominantly back-curved.

Female. TL 4·7, HL 1·10, HW 0·96, CI 87, EL0·46, OI 46, IOD 0·74, SL 0·62, SI 64, PW 0·84, AL 1·30.

As worker but propodeal spines proportionally shorter and the denticulation of the pronotum less well marked. Sculpturation strongly longitudinal on all dorsal sclerites of alitrunk except the propodeum where it appears to be transverse (obscured by glue on specimen). Petiole strongly U- or V-shaped rugulose, the base of the V being posterior.

The abundant long, curved or sinuate, relatively soft hairs which clothe this species make it immediately recognizable amongst its congeners. The closest related known species appears to be *pilosus* but this may be distinguished by its shorter, more stocky alitrunk and marked sculptural differences. The lateral denticulations of the pronotum in *elongatus* are very small and may be overlooked in smaller specimens.

MATERIAL EXAMINED.

GHANA: Bunso (*D. Leston*).

Cataulacus impressus sp. n.

Holotype worker. TL 3·7, HL 0·90, HW 0·86, CI 96, EL 0·46, OI 53, IOD 0·64, SL 0·44, SI 51, PW 0·70, AL 0·98, MTL 0·46.

Occipital crest absent, the occiput and vertex meeting in a smoothly convex curve. Occipital surface just above the foramen with a marked transverse groove or impression, behind which the remaining thin strip of the occiput juts out over the dorsal portion of the foramen itself. Occipital corners each with a single denticle and flanked internally upon the occipital margin by a larger and more conspicuous denticle. Sides of head behind eyes sparsely and minutely denticulate. Clypeal suture demarcated by a strongly impressed arc. Pronotum strongly marginate laterally, the margins sparsely equipped with small, broadly triangular denticles. Mesonotum and propodeum more weakly marginate than pronotum, denticulate, the propodeum armed with a pair of long, broad, dorsoventrally flattened spines which are nearly parallel, only slightly divergent posteriorly. In dorsal view the sides of the pronotum are parallel, the alitrunk becoming narrower at the mesonotum and again at the propodeum. In profile the posterior portion of the mesonotum curves abruptly downwards to the surface of the propodeum so that the more or less flat surfaces of the two are separated by a short but distinct step. Subpetiolar process apparently with a prominent, rounded anteroventral angle and an acute posteroventral angle which is not, however, produced into a spur. Subpostpetiolar process developed, digitiform, simple. First gastral tergite not marginate laterally.

Head with a fine rugoreticulum, the interspaces of which are finely but shallowly reticulate-punctate and shining. Dorsal alitrunk finely longitudinally rugose, the individual rugae widely separated (i.e. distance separating rugae is greater than the width of the individual rugae), the interspaces finely reticulate-punctate and shining. Cross-meshes very sparse upon the dorsum but present in places. Posterior face of petiole with a few very weak transverse rugulae, otherwise the pedicel irregularly finely rugulose and reticulate-punctate. First gastral tergite finely and quite superficially reticulate-punctate, shining.

All dorsal surfaces of head, body and appendages with numerous stout, erect, blunt hairs.

Holotype worker, UGANDA (without further data) (MCZ, Boston).

This small but aberrant species is immediately recognizable by the shape of the alitrunk in profile and the presence of a transverse groove upon the occipital surface just dorsal to the foramen.

Cataulacus pilosus Santschi

Cataulacus pilosus Santschi, 1920 : 118. Syntype worker, female, ZAIRE: Avakubi, 6.1.1914 (*Bequaert*) (NM, Basle) [examined].

Worker. TL 3·1, HL 0·82, HW 0·80, CI 97, EL 0·40, OI 50, IOD 0·64, SL 0·44, SI 55, PW 0·56, AL 0·82, MTL 0·40.

Occipital crest absent; occipital corners armed with one or two denticles which are not much larger than those on the sides of the head behind the eyes. Preocular tooth relatively large and triangular. Eyes widely separated, the surface beween them convex. Margins of alitrunk irregular but not denticulate, although one or two minute, tuberculiform denticulae may be present just posterior to the acute humeral angles. In the syntype worker these are better developed on the right hand side than on the left. Propodeum armed with a pair of very short spines. In dorsal view the sides of the pronotum are virtually parallel, but behind this they converge posteriorly. However, there is no abrupt, sharp-angled narrowing behind the pronotum. Dorsal alitrunk without sutures or vestiges of sutures. First gastral tergite not marginate laterally.

Dorsum of head covered with a fine rugoreticulum, the interspaces of which are densely reticulate-punctate. Pronotal dorsum similarly sculptured but on the mesonotum the cross-meshes are lost, and this area is closely and distinctly longitudinally rugose, almost sulcate-rugose; the constituents somewhat wavy, especially towards the outer margins of the sclerite. Propodeum with fine, dense, arched-transverse rugulation, similarly the posterior face of the petiole and the postpetiole. Dorsum of postpetiole with a few short, longitudinal rugae. First gastral tergite finely and densely but brokenly and unevenly longitudinally rugulose, with reticulate-punctate interspaces.

Entirety of dorsum, but especially the head, abundantly equipped with long, fine, erect hairs, many of which are curved.

This short and rather stocky species can immediately be recognized by the presence of dense, long, fine hairs on all dorsal surfaces of the body, and by the transverse sculpturation upon the propodeum, a combination of characters not shared with any other known species. The erect hairs are in fact noticeably longer than is normal in the genus and, proportional to their length, they are also much finer.

The female of the species was described by Santschi in the same publication as the worker (on page 119) and appears to be essentially similar in form, with the mesoscutum and scutellum longitudinally striate-rugose.

Bequaert (1922) records the species as nesting in the myrmecophilous plant *Cuviera angolensis* Hiern.

Cataulacus striativentris Santschi **stat. n.**

Cataulacus wissmanni var. *striativentris* Santschi, 1924 : 219. Syntype workers, ZAIRE: Ubanghi, Banzyville (*R. P. Augustin*), and Haut Uele, Moto, 1920 (*L. Burgeon*) (NM, Basle; MRAC, Tervuren) [examined].

Cataulacus donisthorpei Santschi, 1937*a* : 61. Syntype workers, KENYA: nos. 17 and 42 (H. Donisthorpe coll.) (BMNH) [examined]. **Syn. n.**

Worker. TL 3·6 – 3·7, HL 0·90 – 0·94, HW 0·86 – 0·88, CI 93 – 95, EL 0·44 – 0·45, OI 50 – 51, IOD 0·62 – 0·64, SL 0·48, SI 54 – 56, PW 0·70, AL 0·94 – 0·96, MTL 0·50 (2 measured).

Occipital crest absent, the two surfaces meeting in a continuous curve. Occipital corners with a single tooth and with a second, smaller tooth beside them on the occipital border. Sides of head behind eyes finely denticulate. Sides of pronotum denticulate, the posteriormost denticle being the largest in the series. Sides of mesonotum and propodeum each with one or two denticulae; the dorsal alitrunk without trace of sutures. Propodeum bispinose, the spines rather short, broad and divergent. The pronotum is quite strongly expanded laterally and is noticeably broader than the remainder of the alitrunk. Node of petiole virtually pointed above when viewed in profile, the anterior and posterior faces sloping steeply away. Subpetiolar process with a developed posteroventral tooth, heel or spur. Subpostpetiolar process simple, long. First gastral tergite not marginate laterally.

Dorsal surface of head coarsely reticulate-rugose in the space between the eyes, and behind the eyes. In front of the anterior margin of the eyes the cross-meshes of the rugoreticulum tend to be lost, leaving this area and the clypeus longitudinally rugose. The interspaces of the occipital sculpturation are very finely and densely reticulate-punctate, and dully shining. Dorsum of alitrunk longitudinally sulcate-rugose, the sculpturation tending to be less well organized and regular on the anterior pronotum than elsewhere. Petiole and postpetiole longitudinally rugose dorsally; the first gastral tergite very closely and densely longitudinally rugose or sulcate-rugose throughout its length.

Simple, erect, blunt hairs numerous on all dorsal surfaces of the head, body and appendages. Margins of head and alitrunk with hairs projecting laterally from the marginal denticles.

This small, large-eyed species is separable from similarly sculptured forms by the presence of hairs upon the dorsal surfaces of the head and body which although numerous cannot be termed abundant and are not very elongate nor sinuate. The disorganized sculpturation of the posterior half of the head capsule contrasts strongly with the regular sulcate-rugulation of the alitrunk. The form described as *donisthorpei* is, on the whole rather less coarsely sculptured than is the type of *striativentris*, and the pronotum less regularly sculptured, but otherwise the two are alike.

Santschi's original association of *striativentris* with *wissmanni* was based upon his use of Forel's description of the latter species in which the characterization of the sculpturation of the alitrunk is inaccurate. Forel (1894 : 79) gives the alitrunk as being 'irregularly longitudinally rugose' when it is, for the greater part, distinctly reticulate-rugose with strongly punctured interspaces. Santschi stated that 'sculpturation not distinctly reticulate-punctate between the ridges of the thorax', which is of course correct for *striativentris*, but the inaccuracy of the original description of *wissmanni* hid the fact that the two sculpturations are fundamentally different.

Cataulacus tenuis Emery

Cataulacus tenuis Emery, 1899 : 288. Holotype female, MADAGASCAR: Antongil Bay, 1897–98 (*Mocquerys*) (possibly in MCSN, Genoa).

I have not been able to examine the type of this species, nor have I seen the worker which was described by Santschi (1913 : 310) and was based upon a single individual recovered by J. de Gaulle in Madagascar, at an unnamed location. However, the two descriptions are so similar in their salient features that Santschi appears to have correctly associated his single worker with the type female.

Both descriptions stress the fact that the head is about one quarter longer than it is wide. This gives a CI in the region of 75, by far the lowest yet recorded in the genus. If this is so then the species can be easily recognized on that single character plus the fact that it is restricted to Madagascar, but the following features are also of note.

Worker. TL 3·5. Occipital corners projecting as broad teeth; the sides of the head behind the eyes without denticles. Sides of alitrunk marginate, denticulate; the propodeum with a pair of short spines. Head and alitrunk longitudinally rugose with an irregular reticulation upon the pronotum. First gastral tergite reticulate-punctate with longitudinal striae upon the basal third. Sparse pilosity is present upon the head and alitrunk.

Female. TL 5·0. As above but Emery (1899) states that the occipital corners of the head are acute and projecting. The clypeus is longitudinally striate but the remainder of the head is more or less reticulate-rugose, as is the pronotum. Mesoscutum and scutellum predominantly irregularly longitudinally rugose; propodeal spines short.

Any specimen from Madagascar combining a relatively very long and narrow head with the above series of characters should be recognizable as *tenuis*.

Cataulacus vorticus **sp. n.**

(Text-figs 16, 19)

Holotype worker. TL 3·5, HL 0·90, HW 0·82, CI 91, EL 0·42, OI 51, IOD 0·64, SL 0·44, SI 54, PW 0·56, AL 0·94, MTL 0·44.

Occiput and vertex meeting through a continuous convexity, occipital crest absent. Occipital corners with a bluntly triangular small tooth and with a denticle close to the tooth upon the occipital margin. Sides of head behind eyes shallowly convex, minutely and irregularly denticulate. Preocular tooth small, broadly triangular, separated from the eye by a smaller, rounded prominence. Pronotum weakly marginate laterally, the humeral angles acute and prominent, dentiform in dorsal view. A single tooth is present on the pronotal margin, close to the junction with the mesonotum. Between the humeral angles and this tooth the margin is smooth, very shallowly concave and without denticles. Sides of mesonotum scarcely or not marginate, without denticles; the propodeum similar and armed with a pair of spines. Dorsal surface of alitrunk without sutures or impressions; sides of alitrunk gradually convergent behind the pronotal tooth. In profile the anterior and posterior surfaces of the petiole strongly convergent dorsally, meeting in what is virtually a right-angle; the petiole without a differentiated dorsal face. Anterior face of postpetiole vertical, the posterior face almost so, the dorsal surface convex. Subpetiolar process simple, with a sharp posteroventral angle. Subpostpetiolar process simple, short, bluntly digitiform. First gastral tergite not marginate laterally.

Dorsum of head with a fine rugoreticulum everywhere, the interspaces finely and densely but shallowly reticulate-punctate, dully shining. Pronotal dorsum similarly but more densely sculptured, the reticulae close together and with a predominantly longitudinal trend. On the mesonotum and propodeal dorsum the rugae are fine and mostly longitudinal, more distinct upon the propodeum; the whole surface finely and quite strongly reticulate-punctate. Declivity of propodeum smooth and shining with scattered, very faint punctures. Petiole with some faint longitudinal rugulae; the postpetiole predominantly densely punctate but with a few faint rugules. First gastral tergite finely and densely reticulate-punctate.

Hairs on clypeus and remainder of the cephalic dorsum strongly clavate, the hairs longer and more distinct upon the clypeus than elsewhere. Dorsal surfaces of alitrunk, pedicel, appendages and gaster with numerous short, very fine, simple hairs, difficult to see on the alitrunk under low magnification.

Paratype workers. TL 3·4 – 3·5, HL 0·84 – 0·90, HW 0·74 – 0·82, CI 88 – 93, EL 0·38 – 0·44, OI 50 – 54, IOD 0·54 – 0·62, SL 0·40 – 0·44, SI 51 – 54, PW 0·52 – 0·56, AL 0·92 – 0·94, MTL 0·42 – 0·44 (3 measured).

As holotype but in the smallest the sides of the head behind the eyes lack denticles and the humeral angles are not as prominent. The subpetiolar process is clearly visible in one specimen and has the anteroventral angle broadly rounded.

Paratype females. TL 4·2 – 4·4, HL 1·00, HW 0·82 – 0·84, CI 82 – 84, EL 0·44 – 0·46, OI 53 – 55, IOD 0·62 – 0·66, SL 0·44, SI 52 – 54, PW 0·72 – 0·76, AL 1·22 – 1·26, MTL 0·44 – 0·46 (4 measured).

Similar to worker but with denticulation of sides of head behind eyes very much reduced or absent. Humeral angles as well developed as in worker but the tooth near the promesonotal junction absent. Propodeal spines short and blunt. Sculpturation of mesoscutum and propodeal dorsum longitudinal, that of the latter stronger than that of the former.

Paratype males. TL 3·8 – 4·0, HL 0·64 – 0·72, HW 0·64 – 0·72, CI 100 – 103, EL 0·28 – 0·34, OI 44 – 47, IOD 0·50 – 0·58, SL 0·28 – 0·30, SI 42 – 44, PW 0·64 – 0·68, AL 1·14 – 1·30, MTL 0·46 – 0·54 (4 measured).

Occipital crest absent; occipital corners acutely angled but not dentate. Sides of head behind eyes not denticulate. Humeral angles acute, dentiform in dorsal view, the remainder of the pronotal margins unarmed, shallowly concave and divergent posteriorly. Anterior arms of notauli strongly developed and cross-ribbed, the posterior arm a very weak impression or absent. Parapsidal furrows very strongly marked, impressed. Sides of remainder of alitrunk not denticulate, the propodeum with a pair of short, acute teeth. Head predominantly rather coarsely reticulate-punctate, with some fine overlying rugulae. Pronotum, mesoscutum and scutellum reticulate-punctate with few or no rugulae. In one specimen the scutum has extensive smooth shiny patches surrounding the apical portions of the parapsidal furrows. Propodeal dorsum longitudinally rugose with reticulate-punctate interspaces; the petiole and usually the postpetiole similarly but much more finely sculptured; or the latter lacking distinct rugulae. First gastral tergite finely and densely reticulate-punctate or merely reticulate, dully shining. Hairs numerous on all dorsal surfaces, everywhere fine and simple.

Holotype worker, NIGERIA: Gambari, under bark of cocoa tree, 30.viii.1969 (*B. Bolton*) (BMNH).

Paratypes. 2 workers, 4 females, 3 males, same data as holotype (BMNH and MCZ, Boston). 1 worker, 1 male, ZAIRE: 91 miles W. of Popokabaka, 2.viii.1957 (*E. S. Ross* and *R. E. Leech*) (MCZ, Boston).

The nest from which the Nigerian specimens were taken was situated in and under the bark of a cocoa tree, at the junction of two main branches about 5 ft above ground level. The tree bark on and in the vicinity of the nest was covered with moss.

This species is closely related to *brevisetosus* and like that species it possesses clavate cephalic and clypeal hairs. It is separable by the armament of the pronotum which here consists of but a single tooth whilst in *brevisetosus* there is a row of denticles on each side.

Cataulacus weissi Santschi

Cataulacus weissi Santschi, 1913 : 310. Holotype worker, CONGO: Brazzaville, 1907 (*A. Weiss*) (NM, Basle) [examined].

Cataulacus traegaordhi var. *plectroniae* Wheeler, 1922*a* : 199. Syntype workers, ZAIRE: Stanleyville, from cavities of *Plectronia* sp. (*Lang & Chapin*) (MCZ, Boston). **Syn. n.**

Cataulacus jeanneli st. *kenyensis* Santschi, 1935 : 272, fig. 6a–c. Syntype workers, KENYA: Nairobi, st. 2, 1660 m, 1932–33 (*C. Arambourg, P. A. Chappuis & R. Jeannel*) (NM, Basle) [examined]. **Syn. n.**

Worker. TL 3·3 – 3·6, HL 0·82 – 0·96, HW 0·74 – 0·86, CI 89 – 95, EL 0·40 – 0·46, OI 51 – 54, IOD 0·58 – 0·64, SL 0·40 – 0·50, SI 51 – 58, PW 0·60 – 0·70, AL 0·90 – 1·00, MTL 0·44 – 0·48 (5 measured).

Occipital crest absent, the two surfaces meeting through a continuous convexity. Occipital corners with a small tooth and with a second such upon the occipital margin close to them. Sides of head behind eyes denticulate. Pronotum marginate laterally, serially denticulate; the margins of the mesonotum and propodeum also with one or more denticles. Propodeum with a pair of short, acute spines. Dorsal alitrunk without sutures. Subpetiolar process complex, the posteroventral angle drawn out into a long heel or spur. Subpostpetiolar process well developed, digitiform, almost as long as the subpetiolar process. First gastral tergite not marginate laterally. Dorsum of head and alitrunk with a fine loose rugoreticulum, the interspaces reticulate-punctate, more strongly so upon the alitrunk than upon the head. Petiole in dorsal view finely and regularly rugose, the rugae U- or V-shaped. First gastral tergite densely reticulate-punctate.

Simple stout, blunt hairs numerous everywhere, very conspicuous.

Female. TL 4·1, HL 0·94, HW 0·84, CI 90, EL 0·42, OI 50, IOD 0·64, SL 0·46, SI 55, PW 0·74, AL 1·20, MTL not measurable.

As worker but with the denticulation of the sides of the head behind the eyes reduced, and also that of the pronotal margins. Propodeal spines short and blunt. Subpetiolar process with the posteroventral angle not as strongly developed as in worker, but still prominent. Sculpturation similar to that of worker but the mesoscutum and scutellum distinctly and quite closely longitudinally rugose.

This small species, although of the *tenuis*-group, resembles *pygmaeus*, from which it is separated by the form of the subpetiolar process, the consistently larger ocular index and the form of sculpture upon the petiole.

As far as can be ascertained *weissi* is restricted to rather densely wooded or forested areas. The female and male were first described by Forel (1916 : 427) from the myrmecophilous plant *Randia myrmecophila* de Wilde, from Zaire. The description of the male is of no value and no specimens have been examined during the course of this study.

MATERIAL EXAMINED.

IVORY COAST: Banco Forest (*W. L. Brown Jr.*). GHANA: Bunso (*D. Leston*).

THE *INTRUDENS*-GROUP

Small to medium-sized species, TL usually more than 4·0, rarely slightly less, the measured range of TL 3·5 – 6·1, the lower measurements occurring only in *fricatidorsus* and small *pygmaeus* workers. Usually rather stoutly built forms with HW > 1·00, rarely less and never less than 0·90; PW > 0·80, very rarely slightly less. The head is most commonly broader than long, CI > 100; in two species CI straddles 100 but only in *pygmaeus* and *ebrardi* is it consistently less than 100. Eyes relatively small, OI < 50 in all cases, usually less than 46, with a measured range of OI 34 – 46.

Hairs always present on the dorsal surfaces of the head, body and appendages, usually conspicuous, short, stout and simple but in some species reduced in size, short and inconspicuous. Pronotum marginate laterally, the margins armed with a series of denticles or small teeth. Sides of pronotum usually somewhat convex in dorsal view and the alitrunk usually strongly narrowed behind the pronotum. Propodeal spines moderate in size, reduced to mere teeth in *mocquerysi*, often quite strongly dorsoventrally flattened and broad in dorsal view. Sculpturation is basically a rugoreticulum with reticulate-punctate interspaces, but this is reduced in some species.

Of the nine species included in this group two are restricted to the Malagasy region. Of the remainder the majority of species are savannah or veldt inhabiting and form the major part of the cataulacine fauna of southern and eastern Africa. One species, *pygmaeus*, seems equally able to survive in most areas but it shows a preference for savannah-like vegetation. The only rain forest inhabiting species of this group which has not been found outside such areas is *mocquerysi*, and it is interesting to note that this species is also structurally the most aberrant of the group, with a highly modified pedicellar structure.

Cataulacus bequaerti Forel

Cataulacus bequaerti Forel, 1913*c* : 316. Syntype workers, ZAIRE: Katanga, Kabanza (Kikondja), Riv. Lovoi, 21.x.1911 (*Bequaert*) (MHN, Geneva; MRAC, Tervuren; MNHU, Berlin) [examined].

Worker. TL 4·5 – 5·1, HL 1·20 – 1·30, HW 1·22 – 1·30, CI 100 – 102, EL 0·50 – 0·52, OI 40 – 41, IOD 1·00 – 1·04, SL 0·60 – 0·62, SI 47 – 49, PW 0·90 – 0·98, AL 1·26 – 1·40, MTL 0·66 – 0·70 (3 measured).

Occipital crest absent; occipital corners with a short, broadly rounded or a poorly developed, acute tooth and with a narrower but more acute tooth on the occipital margin close to the corners. Sides of head behind eyes crenulate or denticulate. Pronotum marginate laterally, the edges denticulate. Remainder of alitrunk denticulate laterally. Propodeum with a pair of broad, dorsoventrally flattened spines. Dorsal alitrunk without any trace of sutures. Subpetiolar process broad, the anteroventral corner extended into a broad, blunt spur, whilst the posteroventral corner forms an obtuse angle. Subpostpetiolar process simple, with a short, rounded, anteromedian prominence. First gastral tergite not marginate laterally.

Dorsal surfaces of head, alitrunk and gaster finely but very strongly and closely reticulate-punctate. The head and alitrunk also possess rugae, which on the head and pronotum form a reticulum, finer and closer upon the former than the latter. On the remainder of the alitrunk the cross-meshes tend to disappear and the rugae acquire a marked longitudinal trend. Apart from a few basigastric rugulae the first gastral tergite is entirely reticulate-punctate.

Stout, blunt, erect hairs numerous on all dorsal surfaces, abundant upon the head.

Of the species closely related to *intrudens*, *bequaerti* may immediately be separated by its marked abundance of short, stout hairs, especially evident upon the head capsule. The sculpturation is reasonably distinctive, the fine and dense but very strong reticulate-puncturation being immediately noticeable. In *intrudens* and other related species this sculpturation is never so emphasized, except on the mesonotum of some forms.

Bequaert (1922 : 370) records this species nesting in galls.

Cataulacus ebrardi Forel

Cataulacus ebrardi Forel, 1886 : 105. Syntype workers, MADAGASCAR: Moroudava (*M. Grandidier*) (MHN, Geneva) [examined].

Worker. TL 4·0 – 4·4, HL 1·00 – 1·08, HW 0·96 – 1·06, CI 96 – 98, EL 0·42 – 0·44, OI 41 – 44, IOD 0·78 – 0·86, SL 0·48 – 0·54, SI 50 – 51, PW 0·82 – 0·90, AL 1·12 – 1·20, MTL 0·50 – 0·56 (2 measured).

Occipital crest absent although the vertex is separated from the occipital surface by an obtuse angle. Occipital corners dentate and with a single tooth upon the occipital margin close to this on each side. Sides of head behind eyes denticulate. Sides of pro- and mesonotum marginate, sparsely denticulate; the mesonotal margins gradually convergent posteriorly but without a marked narrowing immediately behind the pronotum. Sides of propodeum with one or two blunt denticles; the spines quite narrow, short and acute. Dorsal alitrunk completely without sutures. Anteromedian subpostpetiolar process absent. First gastral tergite not marginate laterally.

Dorsum of head with a fine rugoreticulum with reticulate-punctate interspaces. Dorsal alitrunk similarly but much more loosely sculptured on the pronotum, rather more coarsely so upon the propodeum. Mesonotal disc without rugulae, only finely reticulate-punctate, although some fine rugulae may be present towards the lateral margins of the sclerite. Base of first gastral tergite with numerous longitudinal rugae which, however, fade out in the first quarter of the length of the segment and are replaced over the next half of its length by a fine, distinct reticulate-puncturation. This in its turn is replaced on the posterior quarter of the segment by a regular, close, longitudinal rugulation or sulcation.

Erect hairs present upon all dorsal surfaces but on the head and alitrunk they are very short and inconspicuous. On the alitrunk the hairs are longer on the propodeum than on the pronotum. Gastral hairs conspicuous.

The female of this species was described by Forel (1910*a* : 20) from the Amber Mountains of Madagascar but this specimen could not be located during the present study.

Cataulacus fricatidorsus Santschi **stat. n.**

Cataulacus otii st. *fricatidorsus* Santschi, 1914*a* : 26. Syntype workers, SOUTH AFRICA: Natal, Zululand, Dukudu, 27.vii.1905 (*I. Trägårdh*) (NM, Basle) [examined].

Worker. TL 3·5 – 3·8, HL 0·92 – 0·96, HW 0·98 – 1·04, CI 106 – 108, EL 0·40, OI 38 – 41, IOD 0·74 – 0·80, SL 0·48 – 0·50, SI 48 – 50, PW 0·82 – 0·86, AL 0·98 – 1·06, MTL ca 0·50 (2 measured).

Occipital crest absent, the vertex curving into the occiput through an obtuse angle. Occipital corners dentate and with a denticle on the occipital margin close to the corner tooth. Sides of head behind eyes denticulate; the preocular tooth usually reduced and rounded. Pronotum strongly marginate, the marginations expanded laterally so that they distinctly overhang the sides of the segment. Margination equipped with a number of irregular, rounded, tuberculiform denticles, some of which appear to be composed of two or more denticles fused together. Alitrunk strongly narrowed behind the pronotum. Mesonotum marginate but very weakly so, with one or two denticles. Propodeum with one or two lateral denticles and armed with a pair of short, acute spines. Dorsal alitrunk without any trace of sutures. Sides of first gastral tergite not marginate.

Dorsum of head finely reticulate-rugose with reticulate-punctate interspaces. Dorsal alitrunk similarly sculptured but the rugulation extremely fine except on the propodeum, where it is coarser than at any other place on the body. Dorsal surfaces of petiole and postpetiole longitudinally rugose. First gastral tergite strongly reticulate-punctate, without rugulae except at the base where a few longitudinal rugulae occur.

All dorsal surfaces of head and body with erect, stout, short hairs. In profile the hairs on the first gastral tergite are seen to be much denser basally and apically than in the centre of the sclerite.

Separable from *wissmanni* by details of structure and sculpturation, *fricatidorsus* may be distinguished from its immediate relatives by the form of margination and denticulation of the pronotum.

When an eye has been acquired for the species of this group it will be noted that in the present species the gaster tends to be proportionally shorter and broader than in related forms; also the tergite and sternite of the first segment tend to be strongly convex, giving the gaster a markedly short and stocky aspect.

Cataulacus intrudens (F. Smith)

(Text-fig. 26)

Meranoplus intrudens F. Smith, 1876 : 609, p. 11, figs 7, 7a. LECTOTYPE worker, SOUTH AFRICA: Natal, Durban, Weenen District, in acacia thorns (*J. M. Hutchinson*) (BMNH), here designated [examined]. (See note on types, below.)

Cataulacus intrudens (F. Smith) Mayr, 1886 : 364.

Cataulacus intrudens var. *rugosus* Forel, 1894 : 78. Syntype workers, MOZAMBIQUE: Delagoa, in gall, 2.xi.1890 (*Müller, Liengme*) (MHN, Geneva) [examined]. **Syn. n.**

Cataulacus hararicus Forel, 1894 : 79. Syntype workers, ETHIOPIA: southern region, Harar (*Ilg*) (MHN, Geneva) [examined]. **Syn. n.**

Cataulacus johannae Forel, 1895 : 250. Syntype workers, females, MADAGASCAR: eastern Imerina (*M. Sikora*) (MHN, Geneva) [examined]. **Syn. n.**

Cataulacus baumi Forel, 1901*b* : 304. Syntype workers, female, male, ANGOLA: Mossamedes, Cubango-Cuito (MHN, Geneva) [examined]. **Syn. n.**

Cataulacus baumi race *batonga* Forel, 1913*a* : 114. Syntype workers, RHODESIA: Khami River, 22.x.1911 (*G. Arnold*) (MHN, Geneva; MCZ, Boston) [examined]. **Syn. n.**

Cataulacus rugosus var. *subrugosus* Santschi, 1914*a* : 26. Syntype workers, SOUTH AFRICA: Natal, Zululand, junction of Umfolozi Rivers, 29.vi.1905 (*I. Trägårdh*) (NM, Basle) [examined]. **Syn. n.**

Cataulacus baumi race *batonga* var. *bulawayensis* Forel, 1915 : 218. Syntype workers, female, RHODESIA: Bulawayo, 31.v.1914 (*G. Arnold*) (MHN, Geneva) [examined]. [Name not available.]

Cataulacus intrudens st. *intermedius* Santschi, 1917 : 287. Syntype workers, RHODESIA: Bambesi, 25.vi.1914 (*G. Arnold*) (BMNH; NM, Basle) [examined]. **Syn. n.**

Cataulacus johannae race *densipunctatus* Stitz, 1923 : 163. Syntype workers, SOUTH WEST AFRICA (= Namibia): Tsumeb, 13–19.vi.1911 (*Michaelsen*) (location of types not known). **Syn. n.**

Cataulacus baumi st. *pseudotrema* Santschi, 1926 : 244. Syntype workers, TANZANIA: Duthumi, 18.ix.1919 (*A. Loveridge*) (NM, Basle) [examined]. **Syn. n.**

Cataulacus baumi var. *gazanus* Santschi, 1928 : 208. Syntype workers, MOZAMBIQUE: Beira, 6.vi.1920 (*G. Arnold*)(NM, Basle) [examined]. **Syn. n.**

Cataulacus baumi st. *pseudotrema* var. *tangana* Santschi, 1928 : 209. Syntype workers, female, TANZANIA: Tanga, 6.v.1925 (*G. Arnold*) (NM, Basle) [examined]. [Name not available.]

Cataulacus foveosquamosus Santschi, 1937*a* : 58, figs 8, 9. Holotype female, SOUTH AFRICA: Zululand (*I. Trägårdh*) (NM, Basle) [examined]. **Syn. n.**

Cataulacus umbilicatus Santschi, 1937*a* : 59 figs 10–12. Holotype female, MOZAMBIQUE: Beira, vii–viii.1936 (*M. Grobham*) (BMNH) [examined]. **Syn. n.**

Cataulacus rugosus var. *krugeri* Prins, 1965 : 104; pl. 1, figs 1–3; pl. 2, figs 1, 2. Holotype worker; paratype workers, females, males, SOUTH AFRICA: Pumbe 12.v.1962 (*Prins*) (National coll. Insects, Plant Protection Res. Inst., Pretoria). [Name not available.]

Note on *intrudens* types. During the search for the types of this species a single specimen (a male) was found at UM, Oxford which was marked 'type'. However, the date of collection upon the labels was 1879, proving that it was not of the type series as the species was described in 1876.

Amongst the numerous unnamed specimens of the F. Smith collection in the BMNH were five specimens of *intrudens* (3 workers, 2 males) each bearing only a single small data label, inscribed '76, 48. Natal'. This reference was checked against volume 4 of the British Museum Zoological Accessions (1864 1881), and on page 214, under '1876 no. 48' was the information: '*Meranoplus intrudens*. Natal. Presented by F. Smith. This species was found by Mr J. Monkhouse Hutchinson inhabiting thorns of a species of Acacia in the Weenen District, Natal.' This is exactly the information given by Smith in the original description of the species and it is concluded that these five specimens represent the type-series.

These have presently been designated lectotype (worker) and paralectotypes (2 workers, 2 males) and will be deposited in BMNH and MCZ, Boston. There is no trace of the female described by Smith, and this is presumed lost or destroyed.

Worker. TL 4·3 – 5·1, HL 1·04 – 1·48, HW 1·14 – 1·56, CI 103 – 110, EL 0·42 – 0·54, OI 34 – 40, IOD 0·86 – 1·16, SL 0·52 – 0·68, SI 43 – 47, PW 0·94 – 1·30, AL 1·16 – 1·62, MTL 0·54 – 0·82 (15 measured).

Occipital crest absent, vertex and occiput meeting through an angle, not normally confluent in a curved surface. Occipital corners dentate, with a second tooth or denticle internally upon the margin; often also with a few minute denticles on the angle separating vertex and occiput. Sides of head behind eyes usually denticulate, in a majority of cases noticeably so but sometimes the denticles minute, sometimes reducing in size from occipital corner to eye. Rarely denticles are completely absent. When this occurs the workers generally have a female head-shape. Shape of head very variable. On the one hand is a form which may be regarded as extreme worker-shape, and on the other as extreme female-shape, the latter approaching or the same as that found in most queens of this species. Numerous intermediate forms are known and on occasion both extreme forms may be found in the same nest, along with intermediates. The 'worker-shaped' head usually occurs in smaller individuals, more rarely in large, and is characterized by strong denticulation of the sides behind the eyes, strong anterior convergence of the frontal carinae and convexity of the sides of the head behind the eyes. The 'female-shaped' head always occurs in large individuals and shows reduced or absent denticulation of the sides behind the eyes (variable between workers from the same nest series), a reduced tendency for convergence of the frontal carinae anteriorly and a marked lack of convexity in the sides behind the eyes, so that in some individuals these are almost parallel. Alitrunk marginate laterally, denticulate, the denticles variable in size amongst workers, especially upon the pronotal margins. Propodeum with a pair of spines of variable configuration, but which are usually quite broad and somewhat flattened dorsoventrally. Dorsal alitrunk without sutures. Petiole in profile with a steeply sloping anterior face and a usually less steep posterior face, the latter sometimes shallowly concave. These two faces meeting in an acute angle dorsally and occasionally forming a weak ridge at their junction, the petiole without a developed dorsal surface. Postpetiole with a narrow, rounded dorsal surface separating the anterior and posterior faces. Subpetiolar process simple, usually with the antero- and posteroventral angles blunt, more rarely acute but never with the latter extended as a heel or spur. Subpostpetiolar process small and simple or virtually absent. First gastral tergite not marginate laterally.

Sculpturation extremely variable. The most common form of sculpturation consists of a dense rugoreticulum upon the head and pronotal dorsum with reticulate-punctate interspaces and usually with the reticular meshes shagreened. The rugulae usually tend to assume a more longitudinal direction upon the mesonotum and are often reduced or absent in the middle of this sclerite, being replaced wholly or in part by a fine, dense reticulate-puncturation. Propodeal dorsum usually quite strongly longitudinally rugose with few or no cross-meshes; these rugae noticeably more coarse than those upon the pro- or mesonotum. Propodeal declivity with transverse rugae between the spines. In some specimens the cross-meshes of the cephalic rugoreticulum are very reduced, so that the sculpturation is predominantly longitudinal. Variation from this common sculpturation usually occurs by reduction or intensification of one or more of the components. The most coarsely sculptured forms have the dorsal alitrunk and to a lesser extent the head covered with very coarse, strong, predominantly longitudinal rugae. The most weakly sculptured have the head shagreened with scattered foveolae, and the major portion of the dorsal alitrunk similarly sculptured. Traces of rugation are usually maintained on the propodeal dorsum. In large workers the cephalic sculpturation is often somewhat modified. Many of the rugulae are expanded and flattened, obliterating the smaller interspaces. This results in the appearance of coarse foveolae set in a shagreened surface. The pedicel segments usually show longitudinal rugae but some may be irregularly rugose. First gastral tergite varying from finely reticulate-punctate throughout to coarsely longitudinally rugose with reticulate-punctate interspaces.

Erect hairs present on all dorsal surfaces of head, body and appendages but very short and inconspicuous upon the clypeus and cephalic dorsum, and also on the pronotum, where they are usually reduced to very short, stout stubs or even stud-like vestiges.

Female. TL 6·2 – 7·4, HL 1·20 – 1·60, HW 1·24 – 1·66, CI 96 – 103, EL 0·46 – 0·60, OI 35 – 39, IOD 1·00 – 1·30, SL 0·60 – 0·76, SI 46 – 48, PW 1·20 – 1·50, AL 1·70 – 2·10, MTL 0·66 – 0·86 (5 measured).

Head shape as described above for large female-like workers, very rarely shaped similarly to the typical head form of smaller workers. Denticulation of the sides of the head behind the eyes reduced or absent, as is the denticulation of the alitrunk margins. Propodeal spines reduced, proportionately broader and shorter than in the worker. Sculptural variation as described above.

Male. TL 5·3 – 5·7, HL 1·12 – 1·20, HW 1·22 – 1·28, CI 106 – 109, EL 0·44, OI 34 – 36, IOD 0·94 – 0·96, SL 0·54 – 0·56, SI 43 – 44, PW 1·06 – 1·08, AL 1·74 – 1·82, MTL 0·68 – 072 (3 measured).

Head shape similar to small worker, the sides of the head behind the eyes dentate. Pronotum marginate laterally but not denticulate, similarly with the propodeal margins. Propodeal spines short, blunt and very stout. Parapsidal furrows distinct, the notauli acutely V-shaped rather than Y-shaped, with the posterior portion distinct to the margin of the scutellum. Dorsum of head finely and very densely reticulate-rugose, the longitudinal constituents predominating and more emphasized than the transverse; the interspaces reticulate-punctate. Pronotum similarly but more loosely sculptured, the mesoscutum with only a few weak rugulae, predominantly reticulate-punctate. Scutellum and propodeal dorsum with a rather coarse rugoreticulum. Pedicel longitudinally rugose, gaster finely and densely reticulate-punctate. All dorsal surfaces of head, body and appendages with numerous hairs.

The tremendous variation of this species accounts for much of the synonymy quoted above. The majority of these forms were described from variations in head shape or sculpturation, some from even more minor details such as differences in propodeal spine length or in pronotal denticulation. Large workers with female-shaped heads and foveolate sculpturation were responsible for *baumi* and its subspecies and varieties whilst variation in size and sculpturation account for *rugosus* and *johannae* with coarse sculpture on the one hand, and *subrugosus* and *intermedius* with finer sculpture on the other. Many of the forms were stated in their original descriptions to be close to *intrudens* or stated as links between two or more forms. For example, both *intermedius* and *subrugosus* were given as intermediates between *rugosus* and *intrudens*. As this species is the most common of the genus in southern and eastern Africa it is probably the one which Arnold (1917) had in mind when he wrote that, 'many of the so-called species and races are very closely allied, so much so that I believe a study based on more abundant material will later on serve to reduce the present number of species to a much smaller figure'. In fact, when part 4 of his monograph of South African ants was published, Arnold (1920 : 403) went so far as to state that there were probably only the nuclei of two species in the area, one of which included *baumi*, *batonga*, *bulawayensis* and *intermedius*. This observation is now known to be accurate. Santschi (1937*a*) described the female of the species twice, from two separate localities, basing his descriptions to a large extent upon the very characters which had proved so misleading in the past.

The same mistake was made by Prins who, as late as 1965 described a variety *krugeri*, differentiating it from *rugosus* by its, 'slightly longer and more acute epinotal spines and by the sculpture of the abdomen which is less developed'. These are the trifling and intrinsically variable characters so much used by earlier authors and which are responsible for the great proliferation of valueless names in the more variable species of this genus.

C. intrudens nests in twigs and branches of trees and shrubs. Arnold (1917 : 391) records it from hollow twigs of an acacia whilst Prins (1965 : 104) found it nesting in a branch of a red bush-willow, *Combretum apiculatum* Sond.

MATERIAL EXAMINED.

SOMALIA: Duca Abruzzi (*Finzi* coll.). KENYA: near Witu (*A. Loveridge*); Neumann's Boma (*Allen* and *Brooks*); Diani Beach (*F. X. Williams*); Kwale Forest (*M. Steele*); Diani Beach (*N. L. H. Krauss*). TANZANIA: no loc. (*A. Loveridge*); Pangani (*N. L. H. Krauss*). ZAMBIA: Upper Luangwa River (*S. A. Neave*). MALAWI: Mlanje (*S. A. Neave*); between Ft. Mangoche and Chikala Boma (*S. A. Neave*). RHODESIA: Lonely Mine (*H. Swale*), Bulawayo (*G. Arnold*); Bulawayo (*H. Swale*); Marandellus (*G. H. Bunzli*); Victoria Falls (*G. Arnold*); Victoria Falls (*W. L. Brown jr.*); Plumtree (*G. Arnold*); Sawmills (*G. Arnold*); Bembesi (*G. Arnold*); Matopos (*G. Arnold*); Helenvale (*G. Arnold*). MOZAMBIQUE: Lourenco Marques (*H. Junod*); Delagoa (*Wheeler* coll.) Delagoa (*Staudinger*); Delagoa Bay (*R. E. Turner*). ANGOLA: Mossamedes (*Arnold* coll.). SOUTH WEST AFRICA: Aus (*R. E. Turner*); Maud (*Vernay* & *Lang*); Kabulabula (*H. Laing*); Narrugas (*G. Arnold*); Nkate (*Vernay* & *Lang*); Tsotsorogo (*G. U. Son*). SOUTH AFRICA: Transvaal (*Lingnau*); Natal, Slievyre (*Haviland*); Pretoria (*A. L. Carpenter*). MADAGASCAR: no loc. (*Staudinger*).

Cataulacus micans Mayr

Cataulacus rugosus subsp. *micans* Mayr, 1901 : 27. Syntype workers, females, males, SOUTH AFRICA: Port Elizabeth, 1890 (*Brauns*) (NM, Vienna) [examined].

Cataulacus micans Mayr; Forel, 1915 : 219 [raised to species].

Cataulacus intrudens st. *tristiculus* Santschi, 1919*a* : 237. Syntype workers, female, male, SOUTH AFRICA: Cape Province, Port Elizabeth, 1917 (*T. Reese*) (NM, Basle) [examined]. **Syn. n.**

Worker. TL 4·2 – 4·7, HL 1·02 – 1·18, HW 1·04 – 1·12, CI 100 – 102, EL 0·42 – 0·44, OI 39 – 40, IOD 0·80 – 0·86, SL 0·54 – 0·56, SI 49 – 50, PW 0·82 – 0·92, AL 1·12 – 1·22, MTL 0·52 – 0·56 (3 measured).

Occipital crest not developed but the vertex separated from the occiput by an acute angle. Occipital corner dentate, the tooth flanked by a smaller denticle on the occipital margin. Sides of head behind eyes denticulate. Pronotum marginate, the edges weakly denticulate, the denticles not strongly developed, usually appearing as rather low, broadly triangular prominences. Sides of mesonotum and propodeum each with one or two denticles, the latter armed with a pair of spines. Mesokatepisternal tooth relatively very strongly developed, long, triangular and acute, projecting anterolaterally and visible with the alitrunk in dorsal view. Dorsal alitrunk without trace of sutures. First gastral tergite not marginate laterally.

Dorsum of head rather coarsely and closely longitudinally rugose; this sculpturation being derived from a rugoreticulum of which some cross-meshes are visible, though much less strongly developed than the longitudinal component. Interspaces superficially reticulate-punctate, somewhat shining. Sculpturation of dorsal alitrunk variable in intensity but basically of a fine, loose rugoreticulum on the pronotum, the cross-meshes of which tend to be lost on the mesonotum, resulting in a fine, longitudinal rugulation upon that segment. Interspaces everywhere finely and densely reticulate-punctate. Segments of pedical coarsely longitudinally rugose. First gastral tergite very finely sculptured, either with a fine superficial reticulation or reticulate-puncturation and usually with a few faint basigastric rugulae.

All dorsal surfaces of head and body with erect, stout, blunt hairs; those on the head may be very short and inconspicuous.

Female. TL 5·5, HL 1·22, HW 1·20, CI 99, EL 0·48, OI 43, IOD 0·88, SL 0·58, SI 48, PW 1·04, AL 1·54, MTL 0·66.

As worker, with the usual modifications of the alitrunk. Denticles of sides of head behind eyes reduced, the appearance crenulate. Pronotal margination irregular, with only two or three developed denticles. Mesokatepisternal tooth short and blunt. Propodeal spines short and blunt. Sculpturation of head and pronotum as worker, the mesoscutum sparsely longitudinally rugose, the mesoscutellum rather more coarsely rugose. Propodeal dorsum transversely rugose.

Male. TL 4·6, HL 0·90, HW 0·96, CI 106, EL 0·38, OI 40, IOD 0·72, SL 0·50, SI 52, PW 0·84, AL 1·40, MTL 0·58.

Vertex rounding into occiput, the two surfaces not separated by an angle. Occipital corners dentate, sides of head behind eyes denticulate. Sides of pronotum weakly marginate, with one or two tuberculiform denticles. Anterior arms of notauli developed and crossribbed but tending to fade out medially, the posterior arm absent. In dorsal view the shape of the anterior arms tends to be broadly U-shaped rather than V-shaped. Propodeal spines short and blunt. Sculpturation of head as in worker but the longitudinal rugae fine and relatively widely separated. Alitrunk sculptured as female but on the propodeum the rugae diverge posteriorly towards the bases of the spines. Between the spines the rugae are transverse. Erect hairs present on all dorsal surfaces.

The worker is characterized by its very strongly developed mesokatepisternal tooth and the wealky sculptured, often polished gaster.

In the original description Mayr showed how this form differed from *rugosus* (now a synonym of *intrudens*) and from *intrudens* itself. Forel (1915) indicated that *micans* was best treated as a good species and this view is endorsed by the present author.

Cataulacus mocquerysi E. André

(Text-fig. 24)

Cataulacus mocquerysi E. André, 1889 : 229. Holotype worker, SIERRA LEONE (MNHN, Paris) [examined].

Cataulacus mocquerysi var. *nainei* Forel, 1917*b* : 724. Holotype worker, ZAIRE (*H. Kohl*) (MHN, Geneva) [examined]. **Syn. n.**

Worker. TL 4·0 – 5·5, HL 1·00 – 1·40, HW 1·12 – 1·54, CI 110 – 115, EL 0·46 – 0·56, OI 35 – 41, IOD 0·94 – 1·24, SL 0·60 – 0·72, SI 46 – 53, PW 1·02 – 1·48, AL 1·02 – 1·44, MTL 0·56 – 0·60 (10 measured).

Occipital crest absent, the vertex rounding into the occiput. Occipital corners with one or two small teeth or denticles, the sides of the head behind the eyes denticulate in most but only crenulate in some individuals. Pronotum marginate laterally, the margins with a few rather large denticles and terminating posterolaterally in a flattened and strongly expanded, roughly triangular shaped lobe which bears one or two denticles upon its posterior border. Mesonotum with one or two large denticles laterally. Propodeal spines reduced to a pair of very short teeth or to a pair of denticles which may be shorter than those upon the mesonotum, and which are usually blunt apically. Petiole and postpetiole strongly flattened dorsoventrally, without differentiated nodes. In dorsal view both segments are very broadly and stoutly V-shaped, the postpetiole more distinctly so than the petiole. Subpetiolar process with a distinct posteroventral heel or spur. First gastral tergite not marginate.

Sculpturation of head and dorsal alitrunk of a fine, loose rugoreticulum with reticulate-punctate interspaces. In some individuals the rugulae tend to assume a longitudinal direction, especially upon the head. Dorsum of petiole similarly sculptured or merely reticulate-punctate; the most common form has numerous fine longitudinal rugulae. Postpetiole more coarsely sculptured, usually with coarse rugae directed longitudinally. First gastral tergite finely and densely reticulate-punctate.

Stout, erect hairs present upon all dorsal surfaces of the head, body and appendages.

Female. TL 6·8, HL 1·54, HW 1·56, CI 101, EL 0·56, OI 36, IOD 1·22, SL 0·76, SI 48, PW 1·44, AL 1·94, MTL 0·86.

Similar to worker but the rugose part of the sculpturation tending to be more coarse everywhere, and the denticulation of the sides of the head and pronotum to be reduced. Propodeum with a pair of bluntly rounded angles.

The species is characterized by, and is immediately recognizable because of the unique form of the pedicel segments and the great reduction or virtual loss of the propodeal spines.

This small and relatively uncommon species nests in hollow twigs on bushes and trees. A nest examined at the Cocoa Research Institute of Ghana during August 1970 had been made in a dry, hollow twig on a shrub, and was about 3 inches long by 0·25 inch wide. This contained a queen and seven rather small workers along with a number of brood. The workers wander over the bark and leaves of the tree in which the nest is situated but their feeding habits have not been observed.

MATERIAL EXAMINED.

LIBERIA: Cape Mount (*W. M. Mann*); Bendija (*W. M. Mann*); Reputa (*W. M. Mann*); Harbel (*W. M. Mann*). GHANA: Tafo (*B. Bolton*); Bunso (*D. Leston*). NIGERIA: Ibadan (*R. H. Booker*); Gambari (*B. Bolton*). ZAIRE: 50 km south of Tshela (*E. S. Ross* & *R. E. Leech*).

Cataulacus pygmaeus E. André

(Text-fig. 25)

Cataulacus pygmaeus E. André, 1890 : 325. Holotype worker, SIERRA LEONE (*A. Mocquerys*) (MNHN, Paris) [examined].

Cataulacus pygmaeus var. *chariensis* Santschi, 1910*b* : 358. Holotype worker, CHAD: Moyen Chari, Fort Archambault (*J. Decorse*) (MNHN, Paris) [examined]. **Syn. n.**

Cataulacus pygmaeus var. *bakusuensis* Forel, 1913*b* : 350. Syntype female, male, ZAIRE: Bakusu, dans un rameau (MRAC, Tervuren) [examined]. **Syn. n.**

Cataulacus traegaordhi Santschi, 1914*a* : 24, fig. 3. Syntype workers, male, female, SOUTH AFRICA: Natal, Zululand, Dukudu, 27.vii.1905 (*I. Trägårdh*) (NM, Basle; MRAC, Tervuren) [examined]. **Syn. n.**

Cataulacus trägårdhi [sic] var. *ugandensis* Santschi, 1914*b* : 110. Syntype workers, UGANDA: Unyoro Prov., near Hoima, i.1909 (*Ch. Alluaud*) (NM, Basle) [examined]. **Syn. n.**

?*Cataulacus marleyi* Forel, 1915 : 219. Syntype workers, SOUTH AFRICA: Natal, Krants Kloof (*H. B. Marley*) (location of types not known). (Provisional synonym, see below.)

Cataulacus jeanneli var. *aethiops* Santschi, 1924 : 220. Syntype workers, ZAIRE: Kidada-Kitobola, 14/25.ii.1922 (*H. Schouteden*), and Barumbu (*Bequaert*) (MRAC, Tervuren) [examined]. **Syn. n.**

Cataulacus pygmaeus subsp. *suddensis* Weber, 1943 : 378. Syntype workers, male, SUDAN: Upper White Nile, Adok, in the Sudd, 10.vii.1939 (*N. A. Weber*) (probably in AMNH, New York). **Syn. n.**

Worker. TL 3·7 – 4·4, HL 0·94 – 1·10, HW 0·92 – 1·06, CI 94 – 97, EL 0·40 – 0·46, OI 41 – 46, IOD 0·72 – 0·84, SL 0·48 – 0·52. SI 49 – 51, PW 0·72 – 0·90. AL 1·01 – 1·26, MTL 0·48 – 0·56 (15 measured).

Occipital crest absent, the vertex rounding into the occiput. In some specimens the sculpturation of the dorsum of the head terminates quite suddenly behind, giving the appearance of a slight crest. Occipital corners denticulate and with a second denticle close to the corner on the occipital margin; these two denticles small, usually no larger than others upon the body. Sides of head behind eyes denticulate. Sides of pronotum strongly marginate, denticulate, the alitrunk sharply narrowed immediately behind the pronotum, the mesonotum notably less broad. Sides of alitrunk behind the pronotum more weakly marginate, denticulate. Propodeum armed with a pair of broad, dorsoventrally flattened spines. Dorsal alitrunk without sutures. Subpetiolar process variable, either with rounded angles or with the posteroventral angle acute and sometimes prominent. Subpostpetiolar process rather short, simple but distinct. First gastral tergite not marginate laterally.

Dorsum of head with a fine loose rugoreticulum, rarely with the longitudinal component predominating. Interspaces finely, densely and rather faintly reticulate-punctate, the surface somewhat shining. Pronotal dorsum with a rugoreticulum, coarser than that of the head, the meshes widely spaced, the interspaces reticulate-punctate and dully shining. On the mesonotum and propodeal dorsum there is a tendency for the cross-meshes of the reticulum to disappear, leaving a fine, widely spaced and irregular longitudinal rugation. First gastral tergite densely reticulate-punctate, with fine rugulae everywhere upon the disc of the sclerite, predominantly or wholly longitudinal in direction.

Dorsal surfaces of head, body and appendages with numerous short, stout, simple hairs. Rarely these hairs are increased in thickness from base to apex upon the cephalic dorsum.

Female. TL 5·2 – 5·3, HL 1·14 – 1·16, HW 1·08, CI 92 – 95, EL 0·44 – 0·50, OI 40 – 46, IOD 0·80 – 0·84, SL 0·52 – 0·54, SI 48 – 50, PW 0·96 – 0·98, AL 1·48 – 1·50, MTL ca 0·62 (3 measured).

As worker, with the usual modification of the alitrunk for flight. Denticulation of the sides of the head behind the eyes and often of the pronotal margins reduced, sometimes absent from the former. Mesoscutum with marked longitudinal rugation, with few or no cross-meshes.

Male. TL 4·2 – 4·3, HL 0·84 – 0·86, HW 0·90 – 0·92, CI 105 – 109, EL 0·38, OI 41 – 42, IOD 0·66 – 0·72, SL ca 0·44, SI 47 – 49, PW 0·74 – 0·78, AL 1·34 – 1·36, MTL ca 0·58 (2 measured).

Occipital crest absent, occipital corners denticulate and with a second denticle on the occipital margin close to the corners. Sides of head behind eyes denticulate. Preocular tooth reduced to a mere angle or absent. Pronotal margins irregular but not denticulate. Anterior arms of notauli well developed and cross-ribbed, the posterior arm absent or its track marked by a faint impression. Propodeal spines reduced to a pair of acute teeth. Dorsum of head predominantly reticulate-punctate with a few very fine longitudinal rugulae and a weak reticulum close to and behind the eyes. Pronotum similarly sculptured but with a very loose rugoreticulum everywhere, the meshes widely spaced. Mesoscutum quite strongly reticulate-punctate with a few longitudinal rugulae. Propodeal dorsum reticulate-rugose, the rugae here stronger than anywhere else upon the dorsal alitrunk or head. First gastral tergite finely reticulate or superficially reticulate-punctate, shining. Simple erect hairs present on all dorsal surfaces of the head and body.

As mentioned under *brevisetosus* it is possible that individuals of *pygmaeus* which have the cephalic hairs gradually increased in thickness from base to apex may be confused with the former species. Notes on the separation of such forms from true *brevisetosus* are given under that species.

C. pygmaeus is separated from species closely related to *brevisetosus* by its relatively small eyes (OI < 50) and loose, very fine reticulate-rugose sculpturation upon the head and alitrunk, in which the meshes are widely separated.

With one exception, all the synonyms stated above are quite straightforward, involving relatively minor variations in sculpturation and structure. The exception is *marleyi*, which is stated as a provisional synonym. The reason for this procedure is that I have not been able to locate the types of this species, and whilst the original description does not separate it from *pygmaeus* or *traegaordhi* it is very superficial. When the types of *marleyi* are found some characters may be present which will separate it from *pygmaeus* or may on the other hand confirm the synonymy. From the evidence as it stands at the moment I believe that *marleyi* will be found to be a synonym, and more or less identical to *traegaordhi*, a name published in the same year describing an obviously similar form from the same area of South Africa.

Although *pygmaeus* is very widespread in Africa its distribution seems mostly confined to savannah regions or open wooded areas, but it is also known from forests. Nests are made in stems or twigs of low shrubs or trees and the workers forage freely upon the plant. Small coccids are tended on the apical portions of twigs or flower stalks.

MATERIAL EXAMINED.

LIBERIA: Harbel (*W. M. Mann*). IVORY COAST: near Abidjan (*W. L. Brown jr.*). GHANA: Accra (*O. W. Richards*); Larteh (*D. Leston*); Pokoase (*N. L. H. Krauss*); Koforidua (*N. L. H. Krauss*). ZAIRE: Banana (*Bequaert*); Congo da Lemba (*R. Mayné*); Kasai, Dubbi (*H. Schouteden*); Mongende (*H. Schouteden*); Kasai, Ngombe (*H. Schouteden*); Baraka (*R. Mayné*); Kwamouth (*H. Schouteden*); Kasai, Belenge (*H. Schouteden*); Basongo (*H. Schouteden*); Benza Mazola (*R. Mayné*); Bolobo (*H. Schouteden*); Lukala (*H. Schouteden*); Luebo, Kamaiebi (*H. Schouteden*); Haut Uele (*L. Burgeon*); Mayumbe, Kiniati (*R. Mayné*); Nyangwe (*R. Mayné*); Kunzulu (*R. Mayné*); Temvo (*H. Schouteden*); Kunungu (*H. Schouteden*); Kilo (Abetti); Stanleyville (*L. Burgeon*); Kitobola, Kidada (*H. Schouteden*); Katanga, Biano (*A. Mackie*). TANZANIA: Kigoma (*R. Mayné*). KENYA: Mgombe (*A. Loveridge*).

Cataulacus voeltzkowi Forel

Cataulacus voeltzkowi Forel, 1907 : 84. Syntype workers, MADAGASCAR: Grand Comoro Is., Moheli (*Voeltzkow*) (MHN, Geneva; MNHU, Berlin) [examined].

Worker. TL 4·5 – 5·2, HL 1·14 – 1·36, HW 1·20 – 1·32, CI 97 – 105, EL 0·42 – 0·50, OI 34 – 38, IOD 0·88 – 1·00, SL 0·56 – 0·66, SI 46 – 50, PW 0·92 – 1·06, AL 1·28 – 1·48, MTL 0·64 – 0·72 (6 measured).

Occipital crest not developed but vertex and occiput separated by an angle. Occipital corners with a small tooth and also with a smaller tooth flanking them upon the occipital margin; the latter usually bears a few very small denticles. Sides of head behind eyes denticulate. Pronotum marginate, equipped with a series of small denticles, or less commonly the margin with a serrate appearance. Mesonotum and propodeum each with one or two denticles laterally, the propodeum armed with a pair of flattened spines. First gastral tergite not marginate laterally.

Dorsal surfaces of head and alitrunk coarsely and closely reticulate-rugose, with a predominantly longitudinal direction upon the head, mesonotum and propodeum. On the pronotum however the reticulum is more complete and is not directional. The relatively small interspaces between the rugae are finely reticulate-punctate. Gastral rugae very regular and evenly spaced. In dorsal view all rugae originate at the base of the first tergite and initially run longitudinally. Those on the disc, however, terminate in the anterior one-third to one-half of the length of the segment. The laterally situated rugae then curve strongly around the apices of the discal rugae and run transversely across the remainder of the disc. The result is that if a median longitudinal strip of the tergite is examined the rugae thereon run longitudinally in the anterior portion and transversely in the posterior portion. Short, erect hairs are present upon all dorsal surfaces of the head and body, which may be inconspicuous upon the pronotum and mesonotum.

Amongst the species immediately related to *intrudens*, *voeltzkowi* is certainly the easiest to recognize. The unique form of the gastral sculpturation is unmistakable.

Cataulacus wissmanni Forel

(Text-fig. 27)

Cataulacus wissmanni Forel, 1894 : 78. Holotype worker, MOZAMBIQUE: 9.xi.1890 (*A. Muller*) (MHN, Geneva) [examined].

Cataulacus wissmanni race *otii* Forel, 1901*b* : 304. Syntype workers, female, SOUTH AFRICA: Natal, Durban (*Haviland*) (MHN, Geneva) [examined]. **Syn. n.**

Cataulacus wissmanni st. *linearis* Santschi, 1914*b* : 109, fig. 17. Syntype workers, KENYA: Voi, in the Wa-Taita (st. no. 60), 600 m, and Mbuyuni, in Pori (st. no. 63), iii. 1912 (*Alluaud & Jeannel*) (NM, Basle) [examined]. **Syn. n.**

Cataulacus micans race *durbanensis* Forel, 1915 : 219. Holotype worker, SOUTH AFRICA: Natal, Durban, 15.i.1914 (*G. Arnold*) (MHN, Geneva) [examined]. **Syn. n.**

Worker. TL 3·8 – 5·2, HL 0·96 – 1·20, HW 0·96 – 1·20, CI 98 – 104, EL 0·44 – 0·50, OI 41 – 45, IOD 0·74 – 0·90, SL 0·48 – 0·60, SI 50 – 53, PW 0·78 – 1·02, AL 1·06 – 1·50, MTL 0·56 – 0·66 (10 measured).

Occipital crest absent, the two surfaces meeting in an obtuse angle. Occipital corners dentate, with a second short tooth internal to them upon the occipital margin. Sides of head behind eyes strongly convex and denticulate. Sides of pronotum marginate and denticulate, similarly the margins of both the mesonotum and propodeum with denticles. Propodeum bispinose. Mesokatepisternal tooth variously developed; in most individuals large and conspicuous but variable in size even in series from a single nest. Subpetiolar process simple, often without a differentiated posteroventral angle. Subpostpetiolar process weakly developed or virtually absent. First gastral tergite not marginate laterally.

Dorsum of head reticulate-rugose, the rugae usually emphasised in a longitudinal direction, with the interspaces weakly reticulate-punctate. Dorsal alitrunk usually similarly but more finely sculptured except for the propodeum where the longitudinal rugae are more strongly developed. Middle of disc of mesonotum often with the reticulation diminished and the reticulate-punctate sculpturation clearly visible. Petiole and postpetiole longitudinally rugose. First gastral tergite very strongly and often coarsely longitudinally rugose, occasionally throughout its length but more usually with the rugae broken in the middle of the disc and replaced by a fine reticulate-puncturation. All dorsal surfaces with numerous, very conspicuous, relatively long, simple hairs.

Female. TL 5·4 – 6·0, HL 1·14 – 1·22, HW 1·10 – 1·22, CI 97 – 100, EL 0·48 – 0·50, OI 41 – 43, IOD 0·84 – 0·90, SL 0·54 – 0·62, SI 49 – 51, PW 1·02 – 1·10, AL 1·50 – 1·76, MTL 0·62 – 0·72 (2 measured).

As worker but with the denticulation of the sides of the head behind the eyes and the margins of the alitrunk reduced, on the latter to very small, triangular prominences. Propodeal spines short, blunt.

This species may be confused with *ebrardi*, which is certainly closely related. Besides distribution, one of the best separating characters lies in the relative lengths of the alitrunk hairs. In *ebrardi* they are short and inconspicuous whilst in *wissmanni* they are very distinct. Also, in the former species the longitudinal rugation occupies only the anterior and posterior quarters of the length of the first gastral tergite, the intervening space being reticulate-punctate; whilst in *wissmanni* the punctuation on the tergite is usually limited to a patch in the middle of the disc.

MATERIAL EXAMINED.

MOZAMBIQUE: Delagoa Bay (*F. Muir*); Delagoa Bay (*R. E. Turner*). SOUTH AFRICA: Natal, Durban (*G. Arnold*); Natal, Durban (*F. W. B Marley*); Durban (Muir); Durban (*C. B. Cooper*); Durban (*Haviland*).

THE *GUINEENSIS*-GROUP

Medium to large-sized species, TL 4·5 – 9·5, with the head always broader than long, often considerably so, CI 101 – 121, and with relatively small to medium eyes, OI < 45 (measured range of OI 26 – 43).

Simple stout hairs numerous upon all dorsal surfaces of the head, body and appendages except in some individuals of *guineensis* where they may be reduced in number. Pronotum marginate laterally, often strongly so, the margins armed with a series of small teeth or denticles. Besides this the posterolateral portion of the pronotal margination is expanded, usually strongly so, and projects as a spine, tooth or plate. Propodeal spines long, stout and acute, not dorsoventrally flattened.

The three species included in this small group inhabit the rain forests of West and Central Africa, and *guineensis* is probably the most common species of the genus in such areas.

Cataulacus erinaceus Stitz

(Text fig. 21)

Cataulacus erinaceus Stitz, 1910 : 134, fig. 3. Syntype workers, CAMEROUN: Mundame (*Conradt*); and EQUATORIAL GUINEA: Alen (*Tessmann*) (MNHU, Berlin) [examined].

Cataulacus princeps 'Emery'; Forel, 1909*a* : 71. Nomen nudum.

Cataulacus erinaceus var. *crassispina* Santschi, 1917 : 287. Holotype worker, CONGO REPUBLIC: Goda, P. Charleuf (*H. de Buysson*) (NM, Basle) [examined]. **Syn. n.**

Worker. TL 8·1 – 9·5, HL 1·90 – 2·34, HW 2·22 – 2·70, CI 115 – 117, EL 0·62 – 0·74, OI 27 – 29, IOD 1·74 – 2·06, SL 1·16 – 1·38, SI 51 – 53, PW 1·90 – 2·40, AL 2·20 – 2·68, MTL 1·40 – 1·62 (10 measured).

Occipital crest absent, the vertex rounding into the occiput. Occipital corners armed with a large, triangular, broad tooth, the sides of the head behind the eyes strongly denticulate. Preocular tooth relatively small, in some cases indistinct. Pronotum marginate laterally, strongly denticulate; the margination expanded, much broader behind than in front and posterolaterally produced into a long, very broadly triangular spine, the edges of which are denticulate. Sides of mesonotum and propodeum weakly marginate, at least in part, the latter with denticles, the former with at least one denticle. Propodeum with a pair of long, acute, tapering spines which are quite broad basally. In profile both the propodeal spines and the posterolateral pronotal spines are seen to be directed somewhat upwards. The angle of elevation of both pairs of spines tends to vary, and in some specimens the propodeal spines may be directed almost vertically. Sutures absent from dorsal alitrunk but the region of the metanotal groove somewhat impressed, shallowly concave in profile, with the promesonotum on a somewhat higher level than the propodeal dorsum. Petiole and postpetiole nodose, the former more massive than the latter. First gastral tergite not marginate laterally.

Sculpturation of entirety of dorsum of head, alitrunk and pedicel of a coarse rugoreticulum with very finely and densely reticulate-punctate interspaces. First gastral tergite similarly sculptured but the rugoreticulum much finer and more dense.

Short, blunt, stout, erect hairs numerous everywhere, arising from the points of junction of the meshes of the rugoreticulum. This is particularly conspicuous upon the pronotal dorsum.

This species is very easily recognizable due to its large size and distinctive sculpturation. The form and denticulation of the alitrunk also help to separate *erinaceus* from the closely related *guineensis*. Forel (1916 : 427) described the female of this species, which does not differ markedly from the worker. The male remains unknown, as in the majority of African species of *Cataulacus*.

The variety *crassispina* was founded upon a specimen with rather reddish pilosity, shorter propodeal spines which were rather more elevated than usual, and a shorter pedicel. These characters fall well within the limits of variation established in the present survey. Wheeler (1922*a* : 198) noted under *erinaceus* that, 'Forel many years ago gave me a specimen labelled "*Cataulacus princeps* Emery" and has himself referred to it under that name [teste Forel, 1909*a*] which seems to exist only in manuscript'. A specimen loaned by MCZ, Boston, examined during the present survey bears the label '*C. princeps* Emery'. This specimen, as the one referred to by Wheeler, is a very ordinary individual of *erinaceus*, and as no description of *princeps* exists it is here included as a nomen nudum.

In the same publication Wheeler notes that *erinaceus* was found in Zaire running up and down large trees. C. A. Collingwood collected the species from trees in the primary forest reserve of Mount Atewa, Ghana, and the present author has observed individuals in the same locality running upon the moss-covered trunks of living trees and also crawling along the tendrils of a thorny creeper in a clearing. The specimens from Du River, noted below, were taken from a nest 'under moss in the bark of a big tree, 20 ft above ground'.

MATERIAL EXAMINED.

LIBERIA: Degain (*W. M. Mann*); Belleyella (*W. M. Mann*); Du River, camp no. 3 (?). GHANA: Mt. Atewa (*C. A. Collingwood*); Mt. Atewa (*D. Leston*). CAMEROUN: Meyo (*C. A. Collingwood*). ZAIRE: Stanleyville (*H. O. Lang*); Stanleyville (*Forel* coll.); Irangi, Luhoho River (*E. S. Ross & R. E. Leech*); Stanleyville Nyangwe (*Fuacomet*); Kasai, Kondue (*E. Luja*); Miss. St. Gabriel (*Kohl*); Eala (*P. Staner*); Bas Uele, Kotell (*H. Schouteden*); Ituri, Masua (*A. Collart*); Likimi, Mundjungani (*A. Collart*); Kwawa, Bangala (*A. Collart*); Barumbu (*Bequaert*);

Penghe (*Bequaert*); Basongo (*H. Schouteden*); Luebo, Kamaiembi (*H. Schouteden*); Stanleyville (*L. Burgeon*); Kunungu (*H. Schouteden*); Ituri, Medje (*Christy*); Yangambi (*N. L. H. Krauss*).

Cataulacus greggi **sp. n.**

(Text-fig. 22)

Holotype worker. TL 5·2, HL 1·28, HW 1·30, CI 101, EL 0·56, OI 43, IOD 1·02, SL 0·62, SI 47, PW 1·24, AL 1·40, MTL 0·70.

Occipital crest absent, the occiput and vertex confluent through an obtusely rounded angle. Occipital corners dentate, these teeth flanked upon the occipital margin by a second tooth which is almost as large as that at the corner. Sides of head behind eyes strongly denticulate, the preocular tooth well-developed, separated from eye by a rudimentary second tooth which is smaller and bluntly rounded. Humeral angles acute, the pronotum marginate and strongly denticulate laterally. This margination strongly expanded and with its posterolateral portions expanded into a low, broadly triangular extension which is denticulate upon its borders. Mesonotum and propodeum denticulate laterally but with a gap between the denticulation of the former and that of the latter. Propodeum armed with a pair of long, stout, acute, divergent spines. Sutures absent from dorsal surfaces of alitrunk. Alitrunk broadest across the pronotum, narrowed at the promesonotal junction and then of approximately equal width to the bases of the propodeal spines. Subpetiolar process complex, with a rounded but prominent anteroventral angle and a long, extended posteroventral heel or spur. Subpostpetiolar process strongly developed into a ventrally directed, simple digitiform appendage. In profile the steeply sloping anterior face of the petiole meets the sloping posterior face in a narrowly rounded angle, so that no free dorsal face is differentiated. The postpetiole has strongly sloping anterior and posterior faces separated by a broadly rounded dorsum. First gastral tergite not marginate laterally.

Dorsal surfaces of head and alitrunk with a fine but quite dense rugoreticulum, the interspaces of which are finely and densely reticulate-punctate. Declivity of propodeum with a few transverse rugae between the spines. Dorsal surfaces of pedicel predominantly coarsely and irregularly longitudinally rugose with dense interstitial punctures. First gastral tergite finely and densely reticulate-punctate with a few very weak basigastric rugulae only.

All dorsal surfaces of head, body and appendages with numerous simple, blunt, stout, erect hairs.

Paratype workers. As holotype but slightly smaller and with relatively slightly broader heads. TL 4·6 – 5·0, HL 1·12 – 1·20, HW 1·18 – 1·26, CI 104 – 105, EL 0·50 – 0·54, OO 42 – 43, IOD 0·88 – 0·90, SL 0·60 – 0·64, SI 50, PW 1·08 – 1·16, AL 1·26 – ca 1·40, MTL 0·68 (2 measured).

Holotype worker, ZAIRE: Ituri Forest, Epulu, vii. 1955, no. 10 (*T. Gregg*) (MCZ, Boston).

Paratypes. 2 workers, ZAIRE: Yangambi, x. 1956 (*N. L. H. Krauss*) (BMNH).

The affinities of this medium-sized species appear to lie with *guineensis* and *erinaceus*, especially the latter. The production of the posterolateral portions of the pronotal margination is much less distinctly developed here than in *erinaceus* but is none-the-less quite marked; also *greggi* resembles *erinaceus* in sculpturation, strong development of propodeal spines, development of denticulation on the head and alitrunk and form of subpetiolar process. The major differences between them, apart from the development of the pronotal margins lie in size, sculpturation of the first gastral tergite and presence in *greggi* of a second tooth on the occipital margin close to the dentate occipital corners.

Cataulacus guineensis F. Smith

(Text-fig. 23)

Cataulacus guineensis F. Smith, 1853 : 225, pl. 20, fig. 5. Holotype worker, 'Tropical West Africa' (UM, Oxford) [examined].

Cataulacus parallelus F. Smith, 1853 : 228, pl. 19, fig. 6. Holotype female, South Africa: Cape of Good Hope [locality probably incorrect] (UM, Oxford) [examined]. **Syn. n.**

Cataulacus guineensis race *sulcinodis* Emery, 1892 : 563, pl. 15, fig. 8. Holotype worker, Ivory Coast: Assinie (*Ch. Alluaud*) (MCSN, Genoa). **Syn. n.**

Cataulacus sulcatus Stitz, 1910 : 136, figs 4–6. Syntype workers, females, males, Cameroun: Jaundestation (*Zenker*) (MNHU, Berlin) [examined]. [Synonymy by Forel, 1910*b* : 421.]

Cataulacus sulcatus var. *alenensis* Stitz, 1910 : 137. Syntype workers, Equatorial Guinea: Alen (*Tessmann*) (MNHU, Berlin) [examined]. **Syn. n.**

Cataulacus sulcatus var. *fernandensis* Stitz, 1910 : 137. Holotype worker, Equatorial Guinea: Fernando Po Is. (*Zenker*) (MNHU, Berlin) [examined]. **Syn. n.**

Worker. TL 4·5 – 8·6, HL 1·14 – 2·04, HW 1·30 – 2·40, CI 114 – 121, EL 0·38 – 0·62, OI 26 – 30, IOD 1·00 – 1·72, SL 0·74 – 1·22, SI 50 – 57, PW 1·04 – 1·94, AL 1·30 – 2·34, MTL 0·74 – 1·36 (10 measured).

Occipital crest absent although the vertex is usually separated from the occiput by an obtuse angle. More rarely the two surfaces join through a continuous curve. Occipital corners with a single acute tooth. Sides of head behind eyes denticulate, often strongly so. Pronotum marginate laterally, the margins with usually 2–4 rather large denticles and terminating posterolaterally in a large spine or tooth which is very distinct, being several times larger than any of the denticles preceding it upon the margin. Sides of mesonotum and propodeum rounded, immarginate, usually without denticles. Propodeum with a pair of very long, divergent spines. Promesonotal suture variable in development, usually present as a faint impression upon the dorsal alitrunk, rarely more strongly developed but often completely absent. First gastral tergite not marginate laterally.

Sculpturation extremely variable. Dorsum of head usually with a very fine, loose rugoreticulum which becomes much coarser behind the eyes. Interspaces finely reticulate-punctate but these are often effaced, leaving the surfaces almost smooth. Sculpturation of dorsal alitrunk basically a longitudinal rugulation or sulcate-rugation, with very finely punctured interspaces. Differences in intensity of development of this sculpturation are numerous, and the rugae are often wavy or irregular, especially upon the pronotum. Variation of sculpture on the alitrunk extends from forms in which the entirety of the dorsum is covered with strong, irregular, longitudinal rugae to forms in which the sculpturation is mostly effaced, with just a trace of rugation remaining. The space between the propodeal spines is usually strongly transversely rugose. Pedicel segments coarsely rugose. First gastral tergite reticulate-punctate with scattered fine, predominantly longitudinal rugulae.

Development of stout, erect hairs variable. Usually they are present upon all dorsal surfaces of the head and body but may be reduced both in number and size, and rarely, in some individuals may be almost completely absent. A row of outstanding hairs is always present upon the sides of the head behind the eyes and the lateral margins of the pronotum.

Intensity of sculpturation and degree of development of hairs is very often related to the size of the individual, with smaller workers tending to be more hairy and more coarsely sculptured than larger workers.

Female. TL 7·7 – 9·5, HL 1·72 – 2·06, HW 1·92 – 2·30, CI 111 – 115, EL 0·54 – 0·68, OI 28 – 29, IOD 1·48 – 1·78, SL 1·00 – 1·20, SI 49 – 52, PW 1·76 – 2·12, AL 2·32 – 2·86, MTL 1·10 – 1·34 (5 measured).

As worker, with the pronotal marginal tooth very much reduced or absent and with the propodeal spines relatively much shorter. Pronotum usually quite strongly reticulate-rugose but the mesoscutum longitudinally so. In the females examined the presence of reticulate-punctate interstitial sculpturation upon the alitrunk is rather more strongly developed than is usual in workers, and in some females the rugation of the head has a markedly longitudinal trend.

Male. TL 6·7 – 7·3, HL 1·20 – 1·30, HW 1·42 – 1·46, CI 112 – 118, EL 0·48, OI 32 – 34, IOD 1·10, SL 0·64 – 0·70, SI 45 – 48, PW 1·18 – 1·22, AL 1·14 – 1·22, MTL 1·00 – 1·14 (4 measured).

Structure of head basically similar to that of worker, with dentate occipital corners and denticulate sides behind the eyes. Anterior arms of notauli strongly developed, extending almost the length of the sclerite, scarcely or not at all joined before the suture so that the posterior notaular arm is extremely short or absent. Sides of pronotum marginate and denticulate; propodeum armed with a pair of short but strong, acute spines. Head strongly reticulate-punctate with scattered fine rugulae; the latter tending to form a loose reticulum behind the level of the ocelli. Pronotum similarly sculptured, the reticulations usually widely spaced. Anteromedian portion of mesoscutum with a long, narrowly V-shaped area of unsculptured, polished cuticle; the remainder of the segment sculptured as the pronotum. Propodeum very heavily and coarsely rugose, strongly reticulate-punctate. Erect hairs numerous everywhere.

The majority of the synonyms noted above were based on variation in sculpturation in the worker, but *parallelus* was founded on what is now known to be a perfectly ordinary female of *guineensis*. The only strange thing about *parallelus* is its type-locality, given by Smith as Cape of Good Hope. Arnold (1917 : 402) noted that the species did not appear to have been recorded since Smith's time and the present survey seems to indicate that South Africa is outside the range of *guineensis*. It seems probable that the locality is an error.

In Stitz's description of *sulcatus* he recognizes the affinity of his species to *erinaceus* but was not aware that he was dealing with a known species. The synonymy of *sulcatus* to *guineensis* occurred in the same year as the publication by Stitz, but the varieties *alenensis* and *fernandensis* continued to be used. These were based on smaller workers and sculptural differences were invoked to maintain their separation. However, Santschi (1937*b* : 102) noted that the individuals of the var. *alensis* [sic] were very variable in sculpturation, and the present study has shown that these variations are in fact of quite common occurrence in normal nests.

Probably the most common species of the genus in the forested areas of West and Central Africa in which it is found. The worker, which shows a remarkable size range even in a single colony, is distinguished by the presence of a well-developed spine or tooth upon the posterolateral portion of the pronotum. Other species sharing this feature are separable on characters of sculpturation and size.

Mature nests are usually populous, containing several hundred workers, and are formed in rotten branches of otherwise healthy trees, often a considerable distance above the ground. The nests are usually begun by a queen entering a tunnel previously made in the branch by wood-boring beetles or termites; the galleries are later extended by the ants themselves. The preference seems to be for branches which are quite unsound and extensively tunelled previously, either by beetles or termites, and the further activities of the ants tends to weaken the branches to such an extent that they may fall off during storms. This was actually observed by the author in 1969 at the Cocoa Research Institute of Nigeria station at Gambari, when a rotten branch of a cocoa tree containing a large colony broke away during a rainstorm. The ants were seen later moving their brood up an adjacent cocoa tree where they took up residence in another rotten branch. Forel (1916 : 427) recorded this species inhabiting an abandoned wasp nest on the trunk of a tree at Motombé on the Okiavo, Zaire, and noted that at St. Gabriel *guineensis* was running amicably with a *Crematogaster* species. This last is not unknown and I have confirmed that *guineensis* is able to occupy trees in areas dominated by both *Crematogaster striatula* Emery and *Cr. clariventris* Mayr; however, *guineensis* seems to be excluded from areas infested with the rather belligerent *Cr. depressa* (Latreille), along with many other arboreal forms. Workers of *guineensis* have been observed tending aphids and small coccids but, although the workers spend much time wandering upon the tree and occasionally descend to the ground, predatory behaviour has not been noted.

When approached by a potential predator the reaction of the individual ant varies, apparently with the size of the attacker. Workers of *guineensis* occurring upon a tree dominated by *Oecophylla longinoda* (Latreille) will try to avoid contact with workers of that species. If that is impossible, they become completely immobile and rely upon their armour for protection. If, however, the aggressor persists in its attentions, or if the predator is large, the *guineensis* worker rolls up, releases its grip on the bark and escapes by falling into the undergrowth. Wheeler (1922*a* : 199) recorded this species from the stomachs of the toads *Bufo tuberosus* Günther and *B. polycercus* Werner.

MATERIAL EXAMINED.

LIBERIA: Bendija (*W. M. Mann*); Gibi (*W. M Mann*); Belleyella (*W. M. Mann*); Reputa (*W. M. Mann*); Cape Mount (*W. M. Mann*); Monrovia (*O. F. Cook*); Imi (*C. Blickenstaff*). IVORY COAST: Divo (*C. A. Collingwood*); Orstom Res. Sta., near Abidjan (*W. L. Brown jr.*). GHANA: Tafo (*B. Bolton*); Tafo (*C. A. Collingwood*); Bunso (*D. Leston*); Kibi (*D. Leston*); Adeiso (*D. Leston*); Kade (*J. Majer*); Sajimasi (*D. Leston*); Pimpimso (*Strickland*); Ankasa Forest Reserve (*O. W. Richards*); Mampong (*P. M. Room*); Larteh (*D. Leston*); Enchi (*D. Leston*). NIGERIA: Ibadan (*J. T. Medler*); Evin-Odo (*J. T. Medler*); Old Calabar (ex *F. Smith* coll.); Gambari (*B. Bolton*); Gambari (*L. O. Oyatobo*); Olokemeji (*Bridwell*); Ararome (?). CAMEROUN: Mbale Mayo to Ekingli (*G. Schwab*). ZAIRE: Miss. St. Gabriel (*H. Kohl*); Leopoldville (*Lang & Chapin*); Stanleyville (*Lang & Chapin*); Bolobo (*Lang & Chapin*); Eala (*H. Schouteden*); Yambata (*De Giorgi*); Mongende (*H. Schouteden*); Kisantu (*H. Schouteden*); Kunungu (*H. Schouteden*); Yumbi (*H. Schouteden*); Luebo, Kamaiembi (*H. Schouteden*); Basongo (*H. Schouteden*); Kasai, Dumbi (*H. Schouteden*); Luebo (*H. Schouteden*); Kasai, Ngombe (*H. Schouteden*); Yambuya (*Bequaert*); Irebu (*H. Schouteden*); Boma (*H. Schouteden*); Stanleyville (*Bequaert*); S. of Walikale (*E. S. Ross & R. E. Leech*); Lukolela to Basoko (*H. O. Lang*); Akengi (*H. O. Lang*).

THE SPECIES OF THE INDO-AUSTRALIAN AND ORIENTAL REGIONS

In all, some 17 species of *Cataulacus* have been recorded from the Indo-Australian and Oriental regions, one species of which (*longinodus*) is known only from the female caste. Of the 16 species in which the worker is known, females are known for ten of them and males are known for nine. The association of some isolated males and females in the present study has been tentative and where this is the case the description under the individual species headings has been quoted as 'putative male', etc.

Basing the study upon the worker caste the species fall into three informal groups, a summary of which is given below with a synonymic synopsis.

What little is known of the biology of the species is mostly to be found in the publications of Wroughton (1892) and Bingham (1903). Details of the biology are included under the individual species headings, but it is probably safe to say that the biologies of the species do not differ markedly from those of species of the Ethiopian region, which are rather better documented in some cases.

The species are rather thinly distributed, and as one moves eastwards through the island systems and towards New Guinea the number of recorded species gradually falls off, as it also does along the Sumatra–Timor island chain. These may be illustrated by the following west–east island series and the number of species noted from each:

West Malaysia 7, Borneo 6, Philippines 3, Sulawesi 1, Waigeo 1, New Guinea 0; and similarly: Sumatra 6, Java 2, Sumbawa 0.

granulatus-group
  - ***granulatus*** (Latreille)
    - *hispidus* F. Smith **syn. n.**
  - ***hispidulus*** F. Smith
    - *brookei* Forel **syn. n.**
  - ***longinodus*** Forel
  - ***marginatus*** **sp. n.**
  - ***muticus*** Emery
  - ***nenassus*** **sp. n.**
  - ***setosus*** F. Smith
  - ***simoni*** Emery
    - *granulatus* race *andamanensis* Forel **syn. n.**

taprobanae-group
  - ***catuvolcus*** **sp. n.**
  - ***chapmani*** **sp. n.**
  - ***flagitiosus*** F. Smith
  - ***latissimus*** Emery
    - *latissimus* var. *mimula* Menozzi **syn. n.**
  - ***latus*** Forel
  - ***praetextus*** F. Smith
    - *praetextus* var. *sumatrensis* Forel **syn. n.**
  - ***reticulatus*** F. Smith
    - *reticulatus* var. *minor* F. Smith **syn. n.**
  - ***taprobanae*** F. Smith

insularis-group
  - ***insularis*** F. Smith
    - *horridus* F. Smith **syn. n.**

Keys to the species of the Indo-australian and Oriental Regions

Key to Workers

Note: the worker of *longinodus* is not known.

1 Sides of alitrunk without margination, the dorsum rounding into the sides and with a laterally projecting, broad, blunt tubercle at the level of the promesonotal junction. Occipital corners drawn out into a pair of long, acute, broadly triangular spines. Sculpturation on dorsum of alitrunk an extremely coarse foveolate-rugulation with a superimposed fine reticulate-puncturation. (West Malaysia, Borneo, Sumatra) . . . . **insularis** (p. 84)

– Sides of alitrunk marginate, at least on the pronotum; the margination consisting of a flange, ridge or acute angle, often denticulate, separating the dorsum from the sides. No laterally projecting, broad, blunt tubercle present at the level of the promesonotal junction. Occipital corners usually dentate but never projecting as above. Sculpturation of dorsal alitrunk finer, usually a reticulate-rugulation and a fine and dense puncturation 2

2 Larger, very broad species, $\mathrm{HL} > 1{\cdot}35$ (usually $1{\cdot}50$ or more), $\mathrm{HW} > 1{\cdot}60$, $\mathrm{IOD} > 1{\cdot}30$, with relatively very small eyes, $\mathrm{OI} < 25$ 3

– Smaller, less broad species, $\mathrm{HL} < 1{\cdot}35$, $\mathrm{HW} < 1{\cdot}60$, IOD $1{\cdot}20$ or less, with relatively larger eyes, $\mathrm{OI} > 25$ 4

3 First gastral tergite sharply marginate laterally throughout its length. Lateral margins of pronotum and propodeal spines expanded into broad, projecting flanges or plates. Very broad-headed species $\mathrm{CI} > 140$. (West Malaysia, Singapore, Borneo, Sumatra) . . . . **latissimus** (p. 77)

– First gastral tergite without lateral margination. Lateral margins of pronotum and propodeal spines not expanded into broad, projecting flanges or plates. Less broad-headed species, $\mathrm{CI} < 135$. (India, Burma) . . . . **latus** (p. 78)

4 Dorsum of head behind clypeus and dorsum of pronotum without short, erect hairs; a few short hairs may be present around the eyes and on the margins of the head and alitrunk, projecting laterally. In profile the pronotal dorsum usually without minute, raised peaks or tubercles 5

– Dorsum of head behind clypeus and usually dorsum of pronotum with numerous short, erect hairs, either simple or clavate; these are also present on the margins of the head and alitrunk, projecting laterally. In profile the pronotal dorsum with a number of minute raised peaks or tubercles, especially on the anterior half 8

5 First gastral tergite marginate laterally, the margination consisting of a ridge or acute angle separating the dorsum of the sclerite from the sides 6

– First gastral tergite not marginate laterally, the dorsum of the sclerite rounding into the sides 7

6 Occipital crest complete, raised medially into a projecting ridge (Text-fig. 36). Mesonotum covered with a fine rugoreticulum. Dorsal surfaces of femora without stout, erect hairs. Smaller species, $\mathrm{HW} < 1{\cdot}15$, $\mathrm{CI} < 112$, $\mathrm{IOD} < 0{\cdot}85$. (West Malaysia, Borneo, Sumatra) . . . . . . **praetextus** (p. 80)

– Occipital crest complete and sharp but not raised medially into a projecting ridge (Text-fig. 37). Mesonotum with regular, more or less parallel longitudinal rugae. Dorsal surfaces of femora with distinct stout, blunt, erect hairs. Larger species $\mathrm{HW} > 1{\cdot}20$, $\mathrm{CI} > 112$, $\mathrm{IOD} > 0{\cdot}90$. (Philippines) . . **catuvolcus** (p. 74)

7 Occipital crest complete, the median portion raised into a low, posteriorly projecting ridge (Text-fig. 35). Entirety of dorsal alitrunk covered with a fine rugoreticulum. (Borneo) . . . . **reticulatus** (p. 82)

– Occipital crest absent, the dorsum of the head curving into the occiput. Dorsum of pronotum with a rugoreticulum but the mesonotum and propodeum with a series of regular, approximately parallel, longitudinal rugae. (Philippines) ***chapmani*** (p. 75)

8 Propodeal spines long, divergent, broad at the base and gradually tapering apically (Text-figs 31, 41); each spine distinctly longer than half the basal distance separating it from its twin, usually as long or longer than the complete distance separating the spines 9

– Propodeal spines short to virtually absent; weakly or not at all divergent, slightly or hardly tapering from base to apex, usually widely separated, and each spine is usually shorter than half the basal distance separating it from its twin (Text-figs 38, 39) 12

9 On the dorsum of the alitrunk the reticulate-rugulation tending to lose its cross-meshes and to become effaced on the mesonotum where it is secondary to a fine, dense reticulate-puncturation. Dorsa of alitrunk and pedicel with only a few scattered short, thick erect hairs, very indistinct 10

– On the dorsum of the alitrunk the reticulate-rugulation coarse and distinct over the entire surface, not fading out nor becoming secondary to a reticulate-puncturation on the mesonotum. Dorsa of alitrunk and pedicel with numerous distinct short, thick erect hairs, very conspicuous 11

10 In profile the mesonotum forming a short but distinct step at its junction with the propodeum. Pronotum on each side with a prominent rectangular flange, denticulate on its outer margin (Text-fig. 31). The mesonotum with a number of regular, parallel, low, longitudinal rugae. (Sulawesi) . . ***flagitiosus*** (p. 76)

– In profile the dorsa of the mesonotum and propodeum forming a continuous convexity at their junction. Pronotum denticulate on each side but without a prominent rectangular flange (Text-fig. 32). The mesonotum without regular, parallel, low, longitudinal rugae. (India, Ceylon) . . . ***taprobanae*** (p. 83)

11 First gastral tergite finely longitudinally rugose throughout its length over the entire surface of the sclerite, the rugae distinct on the centre of the disc. Head longer, HL > 1·10, CI 105 or less. (Java) . . . . . ***nenassus*** (p. 70)

– First gastral tergite not finely longitudinally rugose throughout its length over the entire surface of the sclerite; at least the disc not rugose. Head shorter, HL < 1·10, CI 109 or more. (Philippines, Moluccas, New Guinea: Waigio Is.) ***setosus*** (p. 71)

12 Propodeal spines represented by a pair of small, obtuse, blunt tubercles. Node of petiole in dorsal view distinctly longer than broad. (Burma) . . ***muticus*** (p. 69)

– Propodeal spines distinct; if very short or dentiform they are acute and the node of the petiole in dorsal view is broader than long 13

13 Hairs on dorsum of head and on clypeus very short, clavate or subglobose. Sculpturation of mesonotum and propodeal dorsum predominantly of longitudinal rugae. In dorsal view the alitrunk without a distinct notch or constriction between the mesonotum and propodeum. Small species, HL 1·00 or less, PW < 0·90, with relatively large eyes, OI > 36. (Ceylon, Andaman Is.) ***simoni*** (p. 72)

Hairs on dorsum of head and on clypeus usually relatively long, simple, stout and blunt. If some cephalic hairs are clavate then the sculpturation of the mesonotum and propodeal dorsum is predominantly a rugoreticulum and in dorsal view the alitrunk has a distinct notch or constriction between the mesonotum and propodeum. Larger species, HL > 1·00, PW > 0·95, with relatively smaller eyes, OI < 36 14

14 Subpetiolar process complex; anteroventrally with a bluntly rounded angle or

tooth and posteroventrally with a long, posteriorly directed spur. Dorsum of petiole in profile low, only shallowly convex (Text-fig. 5). (Borneo, Sumatra) ***hispidulus*** (p. 66)

– Subpetiolar process a simple rectangular or subrectangular rod of varying size and shape; the posteroventral angle may be acute but is without a projecting long spur. Dorsum of petiole in profile high and strongly convex (Text-fig. 6) . . 15

15 First gastral tergite very strongly and distinctly marginate laterally throughout its length, the dorsum markedly separated from the lateral portions of the sclerite. In dorsolateral view the marginations appear as strong ridges. (China: Hainan Is.) . . . . ***marginatus*** (p. 68)

– First gastral tergite not marginate, the dorsum rounding into the lateral portions of the sclerite. In dorsolateral view only an uninterrupted, rounded surface is visible. (Throughout Oriental region, West Malaysia, Borneo, Sumatra, Java) ***granulatus*** (p. 64)

Key to Known Females (Queens)

1 Dorsum of pronotum seen in profile without short, erect hairs although one or two may be present on the margins 2

– Dorsum of pronotum seen in profile with short, erect hairs present, usually numerous, but at least with a transverse row just in front of the promesonotal suture . . 3

2 Dorsum of pronotum distinctly reticulate-rugose. Head reticulate-rugose, the cross-meshes conspicuous, especially between the eyes and the ocelli. Alitrunk narrower, PW < 1·16. (West Malaysia, Borneo, Sumatra) . ***praetextus*** (p. 80)

– Dorsum of pronotum distinctly longitudinally rugose; cross-meshes between the rugae few or none on the disc, more distinct at the sides. Head faintly reticulate-rugose with a distinctly longitudinal direction, the cross-meshes somewhat effaced. Alitrunk broader, PW > 1·16. (Philippines) . . ***catuvolcus*** (p. 74)

3 Occipital corners drawn out into long, broad, coarse triangular spines. (West Malaysia, Borneo, Sumatra) . . . . ***insularis*** (p. 84)

– Occipital corners acute or armed with a denticle or short tooth, never drawn out into broad, coarse, triangular spines as above 4

4 Large species, HL > 1·80, HW > 2·00, the eyes relatively small, OI 25 or less. Frontal groove usually distinct between frontal triangle and median ocellus. (India, Burma) . . . . ***latus*** (p. 78)

– Smaller species, HL < 1·60, HW < 1·70, the eyes relatively large, OI 29 or more. Frontal groove indistinct or absent 5

5 Transverse occipital crest separating vertex from occiput broken or incomplete medially so that the vertex runs into the occipital surface at that point, or the crest broadly and deeply concave medially in full-face view, V- or U-shaped, or both 6

– Transverse occipital crest complete, not broken medially, usually beset throughout its length with denticles from which short hairs arise; the crest not broadly and deeply concave in full-face view 9

6 Subpetiolar process with an extremely long posteroventral spur which is blunt apically. Petiole in profile with the dorsum low and only shallowly convex. (Borneo, Sumatra) . . . . ***hispidulus*** (p. 66)

– Subpetiolar process simple, without a posteroventral long spur. Petiole in profile with the dorsum high and distinctly convex 7

7 Dorsum of head behind clypeus, and pronotum, with abundant erect hairs. Petiole in profile with a weakly convex anterior face and a convex dorsal surface which rounds into the sloping posterior face. (Throughout Oriental region, West Malaysia, Borneo, Sumatra, Java) . . . . . . ***granulatus*** (p. 64)

– Dorsum of head behind clypeus, and pronotum, with a few short, inconspicuous hairs, usually reduced on the pronotum to a single row just in front of the promesonotal suture. Petiole in profile with a flat, sloping anterior face forming an approximate right-angle with the shallowly convex and sloping posterior face, without a dorsal face between them. (India, Ceylon) . . . . ***taprobanae*** (p. 83)

8 Hairs on dorsum of head and pronotum strongly clavate or suborbicular, very short. Small species, HL < 1·10, IOD < 0·80, PW ca 0·90, with relatively large eyes, OI ca 40. (Ceylon, Andaman Is.) . . . . ***simoni*** (p. 72)

– Hairs on dorsum of head and pronotum simple, short and thick or virtually absent. Larger species, HL 1·20 or more, IOD > 0·90, with relatively smaller eyes, OI < 36 usually. If OI approaches 40 then PW > 1·00 9

9 First gastral tergite finely longitudinally rugose throughout its length over the centre of the disc. (Java) . . . . ***nenassus*** (p. 70)

– First gastral tergite not finely longitudinally rugose throughout its length over the centre of the disc 10

10 Upper surfaces of middle and hind tibiae yellow, the lower surfaces black or dark brown. Propodeal spines short and narrow, hardly tapering in their apical halves. Smaller species, PW 1·08, HW 1·20, with the head as broad as long (CI 100) and with eyes relatively large, OI 40. (Sumatra). . ***longinodus*** (p. 67)

– Upper surfaces of middle and hind tibiae similar in colour to lower surfaces. Propodeal spines tapering from base to apex, broadly triangular. Larger species, PW > 1·20, HW > 1·30, with the head broader than long (CI 105 or more) and with relatively smaller eyes, OI 36 or less. (Philippines, Moluccas, New Guinea: Waigeo Is.) . . . . ***setosus*** (p. 71)

Provisional Key to Known Males

1 Dorsal surfaces of head, pronotum and first gastral tergite in profile with numerous erect hairs 2

– At least dorsal surfaces of head and pronotum without erect hairs; if present on first gastral tergite then they are confined to the posterior third of the sclerite. . 7

2 Occipital corners produced into a pair of very long, broadly triangular spines. (West Malaysia, Borneo, Sumatra) . . . . ***insularis*** (p. 84)

– Occipital corners with a denticle or tooth but not produced into long spines . . 3

3 Large, broad-headed species, HW > 1·30, IOD > 1·10, with relatively small eyes, OI < 30 4

– Smaller, narrower-headed species, HW < 1·30, IOD < 1·10, with relatively larger eyes, OI > 30 5

4 First gastral tergite marginate laterally from the base to the level of the spiracle. Pronotum with a strong, flange-like expansion at each side. Very large species, HL 1·36, HW 1·74, PW 1·54. (West Malaysia, Borneo, Sumatra, Singapore) ***latissimus*** (p. 77)

– First gastral tergite not marginate laterally to the level of the spiracle. Pronotum without a flange-like expansion at either side. Smaller species, maximum dimensions of specimens examined, HL 1·26, HW 1·60, PW 1·44. (India, Burma) . . . . ***latus*** (p. 78)

5 First gastral tergite with basigastric costulae and some extremely fine longitudinal rugulae running the length of the dorsum on the outer portions of the sclerite. (Java) . . . . ***nenassus*** (p. 70)

– First gastral tergite with basigastric costulae only. 6

6 Posterior arm of notauli absent; sides of pronotum indistinctly denticulate. (India, Ceylon) . . . . ***taprobanae*** (p. 83)

– Posterior arm of notauli present as a groove or impression; sides of pronotum conspicuously denticulate. (Throughout Oriental region, West Malaysia, Borneo, Sumatra, Java) . . . . **granulatus** (p. 64)

7 First gastral tergite without erect hairs, the remaining tergites each with a strong transverse row of long, close-set, stout hairs. (West Malaysia, Borneo, Sumatra) **praetextus** (p. 80)

– First gastral tergite with some erect hairs on the posterior third of its length, the remaining tergites with hairs which are not, however, arranged in close-set rows . 8

8 First gastral tergite marginate laterally, the margination strongest anteriorly, fading out behind. (Philippines) . . . . **catuvolcus** (p. 74)

– First gastral tergite not marginate laterally. (Philippines) . **chapmani** (p. 75)

THE *GRANULATUS*-GROUP

The group contains eight species characterized by their abundance of conspicuous short, erect, stout and blunt hairs upon all dorsal surfaces of the head and body and by the coarse nature of the sculpturation which in most cases is a rugoreticulum upon the head and dorsal alitrunk. The reticulae are often raised into minute peaks or tubercles at their points of intersection. The interspaces of the rugoreticulum are usually finely and densely reticulate-punctate, but in some species the puncturation is reduced and the interspaces are dully shining. Denticulation of the margins of the head and alitrunk is always well developed and all members of the group present a very rough, pilose aspect.

In the majority of species the propodeal spines are short or very short, and widely separated basally, but in *setosus* and *nenassus* they are elongate and divergent.

It is interesting to note the presence of very short, strongly clavate or subglobular hairs in *simoni*, the smallest species of the regional fauna, as this character compares well to similar developments in some of the smaller species of the Ethiopian region. The possible advantages of hairs of this nature are unknown, but some populations of *granulatus*, the most widespread species of the group, develop hairs which are very similar.

Six of the eight species belong to two complexes of closely related species. The first and largest complex, centring on *granulatus* itself also includes *marginatus*, *hispidulus* and *muticus* in which the occipital crest tends to be incomplete or broken medially and the propodeal spines are short and very widely separated basally. The second complex includes *setosus*, *nenassus* and most probably *longinodus*, the worker of which is not known. In these species the occipital crest is complete and strongly developed, armed with denticles throughout its length, and the propodeal spines are long and strong, paralleling the condition usual in the *taprobanae*-group.

The majority of the species are distributed to the west of the 120th meridian of easterly longitude, which runs roughly through the islands of Luzon, Sulawesi and Flores; only a single species, *setosus*, is found to the east of that line. At present the greatest number of species of the group are found on Java, but this picture will probably change as collections from other localities become larger.

Cataulacus granulatus (Latreille)

(Text-fig. 6)

Formica granulata Latreille, 1802 : 275, pl. 12, fig. 75a-d. Holotype worker, 'GRAND-INDES' (location of type not known).

Cataulacus granulatus (Latreille) F. Smith, 1853 : 226.

Cataulacus hispidus F. Smith, 1876 : 611, pl. 11, fig. 11. Holotype worker, SINGAPORE (UM, Oxford) [examined]. **Syn. n.**

Worker. TL 4·2 – 5·6, HL 1·06 – 1·30, HW 1·22 – 1·52, CI 105 – 120, EL 0·40 – 0·46, OI 27 – 33, IOD 0·90 – 1·20, SL 0·60 – 0·70, SI 45 – 49, PW 0·98 – 1·31, AL 1·16 – 1·50, MTL 0·60 – 0·77 (20 measured).

Occipital crest usually weakened or incomplete medially, the lateral portions of the crest rather poorly defined in most specimens but equipped with a few denticles. Sides of head behind eyes denticulate, the occipital corner itself with a triangular tooth, decidedly larger than the denticles of the occiput or sides. Sides of alitrunk denticulate throughout their length, the denticles extending onto the lateral margins of the propodeal spines. Pronotum broad, the mesonotum narrowing posteriorly to a notch or impression separating it from the propodeum. Propodeal spines varying in length, may be reduced to a pair of small, acute teeth but are always widely separated, little divergent and shorter than half the distance separating the one from the other. Petiole in dorsal view massive, larger than the postpetiole, both segments broader than long, sometimes distinctly so. Subpetiolar process simple or with the postero-ventral angle acute or dentiform, but never drawn out into a long, spur-like projection. In profile the anterior, dorsal and posterior faces of the petiole node forming a more or less continuous convexity so that the node is roughly dome-like. Sides of first gastral tergite not marginate. In dorsal view the basal portion of the sides is jagged or denticulate, the basal border itself is not.

Sculpturation of dorsum of head and alitrunk a rugoreticulum with reticulate-punctate interspaces, very variable in intensity, and the rugae with a tendency to assume a longitudinal direction upon the mesonotum and propodeal dorsum. The rugoreticulum varies from rather coarse, close set and flattened meshes to a very fine, loose organization in which the meshes are narrow and sharply defined. The interspaces are either finely and densely reticulate-punctate, more or less mat or dully shining, or the puncturation is quite superficial, leaving the interspaces shiny. First gastral tergite very finely reticulate-rugose with punctate interspaces and with a tendency towards reduction of the rugae in smaller individuals.

Erect hairs are present on all dorsal surfaces and around the margins of the head, alitrunk, pedicel and gaster and are numerous on the appendages. The hairs are usually short, broad and blunt, but in some populations those of the head and dorsal alitrunk may be very short and more or less clavate.

Female. TL 6·4 – 7·2, HL 1·40 – 1·56, HW 1·48 – 1·60, CI 102 – 107, EL 0·46 – 0·50, OI 29 – 31, IOD 1·16 – 1·30, SL 0·70 – 0·78, SI 44 – 49, PW 1·38 – 1·50, AL 1·96 – 2·14, MTL 0·62 – 0·82 (13 measured).

Similar to worker, with denticulation reduced on sides of head behind eyes and on the lateral portions of the occipital crest. The denticulation of the sides of the pronotum distinct but reduced or even absent on the propodeal margins. Propodeal spines a pair of short teeth. Sculpturation of head and pronotum similar to worker but the rugae of the mesoscutum and scutellum longitudinal, with a few cross-meshes. First gastral tergite usually with a distinct rugoreticulum on the basal quarter of its length which fades out posteriorly to a few weak, longitudinal rugulae. The entire surface finely and densely reticulate-punctate. Distribution of erect hairs as in worker but they are proportionately shorter in the present caste. Those upon the dorsum of the head (but not the margins) appear always to be very short and inconspicuous, and are often clavate or stud-like, even in populations in which the hairs are normal in the workers.

Male. TL 4·8 – 5·4, HL 0·96 – 1·08, HW 1·10 – 1·24, CI 107 – 114, EL 0·36 – 0·40, OI 32 – 35, IOD 0·86 – 0·94, SL 0·56 – 0·64, SI 50 – 52, PW 0·92 – 1·04, AL 1·49 – 1·74, MTL 0·72 – 0·76 (5 measured).

Occipital crest incomplete medially, laterally with only one or two denticles. Sides of head behind eyes denticulate, the occipital corner with a triangular, short tooth. Lateral margins of pronotum and propodeum weakly denticulate, the propodeum with a pair of small teeth. Anterior arms of notauli developed and cross-ribbed, the posterior arm usually represented by a broad, shallow, longitudinal impression, more rarely by a distinct groove. Parapsidal furrows poorly defined, inconspicuous. Sculpturation of dorsum of head a fine loose rugoreticulum with reticulate-punctate interspaces. On the alitrunk the sculpturation is variable. Pronotum sculptured as head but the reticulum more dense; this may extend onto the mesoscutum, scutellum and propodeal dorsum but usually the cross-meshes tend to disappear, leaving these areas longitudinally rugose. Pedicel reticulate-rugose with punctate interspaces, often with the longitudinal rugae predominant. Gaster everywhere finely and densely reticulate-punctate with basigastric costulae usually present. Erect hairs present on all dorsal surfaces of head and body, simple and blunt, relatively long.

C. granulatus is the most widely distributed species of the genus in the Indo-Australian and Oriental regions and also appears to be the most common and most variable of the known forms. The species ranges from Nepal to Ceylon and through Thailand and Burma to Hainan Is., Borneo, Sumatra and Java. It was reported from Burma and Tenasserim by Emery (1889) and from Dehra Dun in Uttar Pradesh by Forel (1906). Bingham (1903) gave the distribution as Burma and Tenasserim 'extending in the Malayan subregion to Borneo and Sumatra'. Bingham also states that this is one of the two species with which he was well acquainted (the other being *taprobanae*) and which he always found wandering about on the bark or leaves of trees and nesting in hollow branches.

Apart from the characters given in the key, one of the best features available for the recognition of the species is the relatively massive and coarsely sculptured petiole. When one has acquired an eye for the characters of this genus the general build and appearance of the segments of the pedicel in *granulatus* are unmistakable and are only likely to be confused with the very closely related *marginatus*, which is, however, separable on the structure of the first gastral tergite.

There is considerable variation in the length of the propodeal spines amongst the workers. Populations from Hainan Is. contain some individuals in which the spines are reduced to a pair of very small but acute teeth, and in some cases there are noticeable differences in spine length amongst members of the same series. Specimens from Java and the Andaman Is. have the hairs on the cephalic dorsum, and usually also the alitrunk, very small and somewhat clavate. In this condition the hairs resemble those found on the head of the female rather than the form usually associated with the worker caste. Sculpturation is variable in detail in the worker, as has been noted above. Usually it is the smaller individuals which possess the finer and looser rugoreticulum and more shining interspaces, but this does not by any means appear to be a hard and fast rule.

MATERIAL EXAMINED.

NEPAL: Baredamar (*E. I. Coher*). INDIA: Uttar Pradesh, Dehra Dun (*Smythies*); Assam, Jorhat (*A. C. Cole*); Andaman Islands, Haddo (*C. Paiva*). CEYLON: Kandy

(*Bingham*). BURMA: Mandalay (*Bingham*); Pegu Yoma (*Bingham*); Bhamo (*L. Fea*); Maymyo (*Bingham*); Taungoa (*E. Y. Watson*). THAILAND: no data (*T. S. Uyeda*); Chiengmai (*A. F. G. Kerr*); Doi Sutep, 1200 ft (*A. F. G. Kerr*); Biserat (*Annandale & Robinson*). CHINA: Hainan Is., Ta Hiau (*J. L. Gressitt*); Hainan, Liamui (*J. L. Gressitt*); Hainan, Loi Mofia (*J. L. Gressitt*). MALAYA: Kuala Lumpur (*H. M. Pendlebury*). SINGAPORE: no data (*Baker*). BORNEO: Sarawak, Mt. Matang (*G. E. Bryant*). JAVA: Semarang (*Jacobson*); Semarang (*L. G. E. Kalshoven*); Buitenzorg (*Verbeek*). SUMATRA: Siantar, Pematang (*W. M. Mann*); Moera Enim (*W. M. Mann*).

Cataulacus hispidulus F. Smith

(Text-figs 5, 39)

Cataulacus hispidulus F. Smith, 1865 : 76, pl. 4, fig. 7. Holotype worker, SUMATRA (*A. R. Wallace*) (UM, Oxford) [examined].

Cataulacus brookei Forel, 1901*a* : 378. Syntype workers, female, male, BORNEO: Sarawak (*Haviland*) (MHN, Geneva) [examined]. **Syn. n.**

Worker. TL 4·6 – 5·8, HL 1·10 – 1·30, HW 1·31 – 1·50, CI 112 – 123, EL 0·40 – 0·48, OI 30 – 34, SL 0·64 – 0·72, SI 46 – 48, PW 1·14 – 1·25, AL 1·14 – 1·22, MTL ca 0·70 (6 measured).

Occipital crest incomplete medially, the vertex rounding into the occiput. Occipital corners with a relatively large tooth followed by three or four smaller denticles along the occipital crest on each side. Sides of head behind eyes strongly denticulate. Edges of frontal carinae usually jagged, often more strongly so on the posterior than the anterior half, which in some cases is virtually smooth. Alitrunk with a massive appearance in dorsal view, short and broad, with the pronotal margins strongly denticulate. Propodeal spines narrow and short, each one less than half the length of the distance separating it from its twin. Petiole short and low in profile, the anterior face sloping gently into the very weakly convex dorsal surface. The latter curves posteriorly to the junction with the postpetiole, there being no distinct free posterior face to the petiole. Subpetiolar process large and complex, anteroventrally with a bluntly rounded angle or tooth and posteroventrally with a long, posteriorly directed spur. First gastral tergite short, broad, convex, not marginate laterally.

Sculpturation of dorsum of head and alitrunk a rather coarse and well-defined rugoreticulum, the interspaces of which are feebly reticulate-punctate and shining. First gastral tergite sculptured as alitrunk but the rugoreticulum much finer and the puncturation of the interspaces more distinct. Propodeal declivity finely and densely reticulate-punctate.

All dorsal surfaces of head, body and appendages with abundant thick, blunt hairs, yellowish or white in colour and very distinct. On the head and alitrunk the hairs tend to arise from the points of intersection of the meshes of the reticulum.

Female. TL 7·2, HL 1·56, HW 1·66, CI 106, EL 0·50, OI 30, IOD 1·34, SL 0·74, SI 44, PW 1·54, AL 1·97, MTL 0·94.

As worker but denticulation of sides of head reduced to small, blunt tubercles. Propodeal spines shorter than in worker but still distinct. Subpetiolar process with the posteroventral spur more strongly developed, very long and conspicuous. First gastral tergite much longer than broad, length ca 2·40, width ca 1·70. Sculpturation of head and pronotum as worker with a similar arrangement of short, blunt hairs, but the interspaces of the rugoreticulum are less shiny and have a granular appearance. Mesoscutum and scutellum coarsely longitudinally rugose with a few transverse meshes, many of which are incomplete. First gastral tergite with an extremely fine rugoreticulum, coarsest basally, and a dense reticulate-puncturation.

In the centre of the sclerite is a short, longitudinal strip which is virtually devoid of sculpturation and contrasts with the surrounding areas.

Male. The head of the male examined (syntype of *brookei*) is missing. PW 0·92, A: 1·64, MTL 1·75.

Notauli well developed, the anterior arms with some distinct cross-ribs. Limits of the posterior arm poorly defined laterally, the groove distinct and broad. Parapsidal furrows absent or almost completely masked by the sculpturation, visible on one side as a slightly more shining strip in the syntype of *brookei*. Propodeal spines reduced to a pair of minute but acute teeth. Subpetiolar process short and blunt, without the posteroventral spur characteristic of the worker and female castes. Sculpturation of alitrunk a fine rugoreticulum, coarsest on the pronotum, the interspaces reticulate-punctate. Pedicel similarly sculptured but gaster with only a very fine, superficial reticulate-puncturation. Abundant short, thick white hairs present as in the other castes. Exposed portion of parameres smooth and shining, unsculptured apart from the pits from which hairs arise, strongly arcuate in ventral view.

Of the species immediately related to *granulatus*, *hispidulus* is the most easily distinguished. The shape of the petiole and its ventral process is distinctive and will effectively separate the species from all others in the Indo-Australian and Oriental regions, but the general body form of the worker renders it very easily identifiable when one is acquainted with the genus. The short, stocky build of the body, sharp rugoreticulum with shining interspaces and the abundant hairs form an easily recognizable combination of characters, not seen in any other ally of *granulatus*.

Emery (1887) gave some short notes on *hispidulus* collected in Borneo by Doria and Beccari and appears to have identified the species correctly. It seems probable that when Forel (1901*a*) described *brookei* he was unaware of these notes and was misled by the valueless description of Smith (1865) into assuming that he had a new species. Dalla Torre (1893) gave *hispidulus* as a variety of *granulatus*, but Donisthorpe (1932), when reviewing Smith's types, voiced the opinion that *hispidulus* was a good species, as has proved to be the case.

MATERIAL EXAMINED.

SUMATRA: no data (*Smith* coll., may be of type series). BORNEO: Sarawak, Mt. Bongo (*J. Hewitt*); Kuching (*J. Hewitt*); Sandakan (*Baker*).

Cataulacus longinodus **Forel stat. n.**

Cataulacus granulatus var. ***longinoda*** Forel, 1912 : 60. Holotype female, SUMATRA: Indrapura (*Tritschler*) (MHN, Geneva) [examined].

Holotype female. TL 5·5, HL 1·20, HW 1·20, CI 100, EL 0·48, OI 40, IOD 0·96, SL 0·64, SI 53, PW 1·08, AL 1·60, MTL 0·67.

Occipital crest complete, shallowly concave, armed with denticles along its length; the denticles largest laterally, becoming gradually smaller towards the middle of the crest. Occipital corners each with a larger, slightly upcurved tooth. Eyes large; the sides of the head behind the eyes virtually without denticles. Edges of frontal carinae smooth, not jagged or crenulate. Sides of pronotum distinctly denticulate. Propodeum with a pair of short, narrow, acute spines. Petiole with dorsal surface convex, the subpetiolar process simple, subrectangular. First gastral tergite 1·83 long, 1·26 wide, marginate basally, this margination extending for a short distance on the sides of the sclerite.

Head reticulate-rugose with the cross-meshes incomplete in places and suppressed medially so that the rugae have a longitudinal trend, particularly in the middle of the dorsum. Pronotum with a coarse and disorganized rugoreticulum, but on the scutum and scutellum the rugae are longitudinal. On the propodeal dorsum two groups of rugae diverge from the anterior margin of the segment toward the spines and there is a subtriangular gap between the groups occupied by a few transverse rugae which continue on the declivity. First gastral tergite with some very fine meandering rugulae superimposed upon a fine, dense reticulate-puncturation.

Short, thick, hairs abundant, on the head some of these are gradually thickened from base to apex and appear clavate. Dorsal surfaces of middle and hind tibiae yellow, the ventral surfaces dark brown or black.

This species, known only from the type collection of a single female, is distinct from other members of the *granulatus*-group in a number of characters. It is distinguished from *simoni*, which it resembles most, by its larger size, more coarse sculpturation and lack of clavate hairs on the pronotum; and from other related species by the possession of a complete occipital crest, bicoloured tibiae, relatively narrow head and large eyes. The worker of this species may probably be similar to *setosus* but with relatively larger eyes, narrower head, more regular sculpturation and shorter propodeal spines.

The name *longinodus* is something of a misnomer for although the node is relatively longer and narrower than in *granulatus* it is by no means exceptional to the group as a whole. The petiole is in fact relatively shorter and broader than in queens of *simoni*.

***Cataulacus marginatus* sp. n.**

(Text-fig. 38)

Holotype worker. TL 5·3, HL 1·24, HW 1·38, CI 111, EL 0·44, OI 32, IOD 1·08, SL 0·62, SI 45, PW 1·20, AL 1·42, MTL 0·70.

Occipital crest concave, the lateral portions better developed than the median which is represented only by a row of denticles. Lateral portions of the crest denticulate, as are the sides of the head behind the eyes. Occipital corners with a small, triangular tooth. Sides of frontal carinae irregular, especially on the posterior half, but their overall outline in full-face view is very weakly convex, and convergent anteriorly. Margins of pronotum, mesonotum and propodeum strongly denticulate, with a few denticles upon the outer margins of the propodeal spines. A small gap is present separating the denticles of the pro- and mesonotum and a larger, more obvious impression or notch occurs between mesonotum and propodeum. Propodeal spines with their bases widely separated, the spines themselves narrow, acute and each one shorter than half the basal distance separating it from its twin. Petiole in dorsal view massive, notably more so than the postpetiole, both segments broader than long. In profile the anterior, dorsal and posterior surfaces of the petiole form a more or less continuous convexity. Subpetiolar process simple, truncated basally. Sides of first gastral tergite very strongly marginate, the margins prominent.

Head reticulate-rugose, the interspaces shallowly reticulate-punctate and dully shining. Dorsum of alitrunk similarly sculptured, the points of intersection of the rugae raised into minute tubercles. Declivity of propodeum transversely rugose. Sculpturation of pedicel as alitrunk but coarser, first gastral tergite very finely reticulate-rugose with reticulate-punctate interspaces. Dorsal surfaces and lateral margins of head, body and appendages with numerous short, thick, blunt whitish hairs.

Paratype workers. TL 4·8 – 6·0, HL 1·16 – 1·32, HW 1·30 – 1·50, CI 112 – 114, EL 0·42 – 0·46, OI 31 – 32, IOD 1·02 – 1·14, SL 0·60 – 0·66, SI 43 – 46, PW 1·10 –1·30, AL 1·28 – 1·56, MTL 0·68 – 0·76 (9 measured).

As holotype but the sculpturation of the alitrunk somewhat variable. The rugae may tend to take on an apparently longitudinal direction due to the emphasis being placed on those rugae. The cross-meshes are reduced but not lost. In some the components of the rugoreticulum are rather more broad, flattened and less sharply defined than in others.

Holotype worker, CHINA: Hainan Is., grove near Hoi Man Chuen, S.W. of Nodoa, 4.vii.1929, Lingnan University 5th Hainan Is. expedition, 1929 (MCZ, Boston).

Paratypes. 4 workers, CHINA: Hainan Is., Ta Hau, 7.vii.1935 (*J. L. Gressitt*) (BMNH). 1 worker, same data as above but 4–5.vii.1935 (MCZ, Boston). 4 workers, CHINA: Hainan Is., Nodoa, 15–17.vii.1935 (*J. L. Gressitt*) (MCZ, Boston).

Extremely closely related to *granulatus*; separable from that species only by the possession of a very strongly marginate first gastral tergite. As *granulatus* itself occurs on Hainan Is. there is a possibility that *marginatus* is only a local population of that species and further collecting may show the two forms to be intergradient. It should be stressed that the gastral margination of the new species is very strongly developed and is visible to the naked eye, and this character serves easily to distinguish the two.

Cataulacus muticus Emery

Cataulacus muticus Emery, 1889 : 507, pl. 10, fig. 17. Holotype worker, BURMA: Tenasserim, Thagata, Mt. Mooleyit (*L. Fea*) (probably in MCSN, Genoa).

No specimens of this enigmatic species have been available for the present study. Apart from the type there is only one other collection referred to in the literature and that is the one reported by Bingham (1903 : 124) from the Ruby Mines district of Upper Burma, collected by Bingham himself and probably used as the basis of his description of the species. The notes on the characters of the species given below are thus culled from Bingham (1903) and Emery (1889) and from the figure of the dorsal alitrunk and pedicel appended to the latter publication.

Worker. TL 5·5 – ca 6·0. Head as in *granulatus* but proportionately larger and with the denticles of the sides of the head behind the eyes larger and more produced. Sides of pronotum and mesonotum strongly denticulate, but the sides of the propodeum with only one or two denticles and converging posteriorly. Propodeum with a pair of obtuse and blunt tubercles (referred to in Bingham as 'slightly produced rounded projecting laminae'). Petiole distinctly longer than broad, rather slender; postpetiole longitudinally oval, truncated in front and behind. Gaster as in *granulatus*. Head, alitrunk and pedicel very coarsely reticulate-rugose, the pedicel remarkably rugose. Gaster finely punctate and with fine longitudinal rugulae. Pilosity 'rather long', whitish in colour.

The overall picture which emerges is of a medium-sized species, definitely of the *granulatus*-group and seemingly closely related to *granulatus* itself, and yet distinguished by the presence of blunt propodeal tubercles instead of spines, the node of the petiole which is distinctly longer than broad, and the relatively smooth sides of the propodeum. Bingham, who was acquainted with *granulatus*, says that the head, alitrunk and pedicel of *muticus* were more coarsely sculptured than in any other species known to him.

Cataulacus nenassus sp. n.

(Text-fig. 41)

Holotype worker. TL 4·8, HL 1·16, HW 1·18, CI 101, EL 0·42, OI 35, IOD 0·90, SL 0·62, SI 53, PW 0·94, AL 1·30, MTL 0·61.

Occipital crest complete, shallowly concave in full-face view and denticulate throughout its length, the lateral denticles larger than those situated more mesad. Sides of head behind eyes denticulate, terminating in a small tooth at the occipital corners. Pronotal margins with four or five relatively large denticles and one or two smaller; mesonotal margins with two denticles, the sides of the propodeum and outer margins of the spines with numerous small or minute denticles. Propodeal spines long and strong, divergent, relatively close set basally. Petiole in profile with the anterior face steeply sloping, the dorsal and posterior faces continuous. First gastral tergite not marginate but with a few small denticles laterally towards the base.

Dorsum of head reticulate-rugose, the interspaces dully shining, finely and densely but shallowly reticulate-punctate. Dorsal alitrunk similarly sculptured but with the rather flattened longitudinal rugae tending to predominate. Propodeal declivity with a few faint, transverse rugae. Nodes of petiole and postpetiole similarly but rather more coarsely sculptured than the alitrunk, the points of intersection of the rugae raised into peaks (best seen in profile). First gastral tergite finely reticulate-punctate, with a fine but distinct, predominantly longitudinal rugulation covering the entire surface of the sclerite.

Short, erect, blunt hairs numerous upon all dorsal surfaces of the head and body, and also upon the appendages.

Paratype workers. TL 4·8 – 5·1, HL 1·16 – 1·20, HW 1·20 – 1·22, CI 100 – 105, EL 0·40 – 0·42, OI 32 – 35, IOD 0·90 – 0·92, SL 0·58 – 0·64, SI 48 – 53, PW 0·98 – 1·00, AL 1·30 – 1·36, MTL 0·60 – 0·66 (6 measured).

As holotype but with the number of large denticles on the pronotal margins variable, with a maximum of seven in the specimens available.

Paratype females. TL 5·8 – 6·2, HL 1·24 – 1·30, HW 1·24 – 1·30, CI 100, EL 0·44 – 0·46, OI 34 – 35, IOD 0·96 – 1·00, SL ca 0·68, SI 52 – 53, PW 1·10 – 1·19, AL 1·68 – 1·78, MTL 0·68 – 0·70 (5 measured).

As worker but with denticulation of occipital crest and sides of head behind eyes reduced. Sides of pronotum with four or five weak denticles; sides of propodeum irregular but not markedly denticulate. Propodeal spines shorter but distinct. Sculpturation of head, pronotum, pedicel and gaster similar to but rather more coarse than in the worker. Mesoscutum strongly longitudinally rugose, as is the propodeum. Scutellum similar but with some distinct cross-meshes, and without a transverse groove dividing it into anterior and posterior portions.

Paratype males. TL ca 5·2, HL 1·00 – 1·04, HW 1·02 – 1·10, CI 102 – 106, EL 0·40 – 0·42, OI 38 – 39, IOD 0·80 – 0·84, SL 0·62 – 0·64, SI 56 – 58, PW 0·92 – 0·98, AL 1·56 – 1·64 (2 measured).

Occipital crest complete and denticulate; sides of head behind eyes denticulate, terminating in a short, triangular tooth at the occipital corners. Sides of pronotum strongly marginate and denticulate. Sides of propodeum unarmed, the spines short but distinct. Anterior arms of notauli well developed and cross-ribbed, the posterior arm broad and shallowly demarcated. Head longitudinally rugose with a few cross-meshes, the rugae in one specimen tending to arch posteriorly and become transverse behind the ocelli. Pronotum sharply reticulate-rugose with punctate interspaces, as are the scutellum and propodeal dorsum, but the scutum is predominantly longitudinally rugose. Gaster very finely and faintly reticulate-punctate with numerous fine basigastric costulae, and some extremely fine longitudinal rugulae on the lateral portions of the tergite. All dorsal surfaces of head, body and appendages with numerous hairs.

Holotype worker, JAVA: Semarang, no. 945, 7.ii.1928 (*L. G. E. Kalshoven*) (MCZ, Boston).

Paratypes. 9 workers, same data as above; one pin, bearing three specimens, has a second label which repeats the data of the first and adds 'Teak Forest' (BMNH; MCZ, Boston; USNM, Washington). 6 alate females, same data as holotype (MCZ, Boston; BMNH). 1 alate female, 'Java zee', 11.ix.1920 (*Kl. Kombuis*) (MCZ, Boston). 2 males, same data as holotype (MCZ, Boston; BMNH).

This species is very closely related to *setosus* but may immediately be separated from it by the nature of the gastral sculpture in both worker and female. Also, in the *nenassus* worker the alitrunk is proportionately narrower and longer (width to length ratio 1 to 1·3 or 1·4) than in *setosus* which has a width to length ratio of about 1 to 1·1. The head is also narrower, the range of cephalic indices recorded in the type-series being 100–105 as compared to a range of 109–111 in *setosus* workers.

Apart from the fact that the species inhabits teak forests nothing is known of its biology.

Cataulacus setosus F. Smith

Cataulacus setosus F. Smith, 1860 : 114, pl. 1, fig. 7. Holotype worker, INDONESIA: Moluccas, Batjan (=Batchian) Island (*A. R. Wallace*) (UM, Oxford) [examined].

Worker. TL 4·1 – 4·2, HL 1·06 – 1·08, HW 1·16 – 1·20, CI 109 – 111, EL 0·40 – 0·42, OI 34 – 36, IOD 0·90 – 0·96, SL 0·58 – 0·62, SI 50 – 52, PW 0·92 – 1·07, AL 1·08 – 1·18, MTL 0·58 – 0·62 (5 measured).

Occipital crest complete, with denticles throughout its length. Sides of head behind eyes denticulate, the occipital corners with a small tooth which is, however, larger than either the denticles of the sides or of the occipital crest. Sides of pronotum marginate, the margins strongly denticulate. Sides of mesonotum and propodeum denticulate, the denticles extending onto the outer margins of the propodeal spines. Propodeal spines long, broad basally and tapering to an acute apex, each spine at least as long as half the distance separating it from its twin. Sides of first gastral tergite not margined but with a few small to minute denticles or prominences on the basal quarter of the sides when the gaster is examined in dorsal view.

Sculpturation of head and alitrunk coarse, conspicuous and somewhat variable. Dorsum of head posteriorly with a distinct rugoreticulum and with reticulate-punctate interspaces. Anteriorly the rugae tend to have a longitudinal direction, usually restricted to the area in front of the level of the anterior ocular margin although occasionally the rugoreticulum may extend almost to the clypeus. Pronotal dorsum strongly but rather loosely reticulate-rugose, the points of intersection of the rugae raised into small prominences; the interspaces reticulate-punctate. Mesonotal and propodeal dorsa sculptured as pronotum or with the sculpturation less intense, or with the rugae tending to assume a roughly longitudinal pattern. First gastral tergite densely and rather coarsely reticulate-punctate with fine longitudinal rugulae present basally and on the sides of the sclerite. The disc bears only the basic puncturation or has a few disorganized, short, broken rugulae.

Short, thick, blunt erect hairs numerous and conspicuous upon all dorsal surfaces of the head, body and appendages.

Female. TL 5·5 – 5·9, HL 1·22 – 1·26, HW 1·34, CI 106 – 109, EL 0·46 – 0·48, OI 34 – 36, IOD 1·06 – 1·08, SL 0·64 – 0·72, SI 48 – 54, PW 1·22 – 1·26, AL 1·68 – 1·76, MTL 0·72 – 0·74 (2 measured).

As worker but denticles on sides of head reduced, as are those on the sides of the alitrunk in dorsal view. Propodeal spines short and broad, acute. Sculpturation of head and pronotum as described above, but with the cephalic rugae having a more distinct longitudinal direction than in the worker. The mesothoracic sclerites and the propodeum are longitudinally rugose dorsally with the interspaces finely reticulate-punctate.

A member of the *granulatus*-group, *setosus* is separated from the majority of the species by its long propodeal spines, a character more in keeping with the species of the *taprobanae*-group. It is quickly distinguishable from *nenassus*, its closest relative, by the different gastral sculpturation in the latter, which has longitudinal rugulation over the entirety of the first tergite.

C. setosus represents the furthest known easterly penetration of the genus, being found on at least one island off the western extremity of New Guinea and possibly occurring on the mainland also.

MATERIAL EXAMINED.

PHILIPPINES: Mindanao Is., Davao (*C. F. Baker*); Mindanao (*A. M Moore*). MOLUCCAS: Batjan Is. (*F. Smith* coll.). NEW GUINEA: Waigeo Is., 2500 ft (*L. E. Cheesman*).

Cataulacus simoni Emery

(Text-fig. 40)

Cataulacus simoni Emery, 1893*a* : 248. Syntype workers, CEYLON: Kandy; Colombo, i.-ii.1892 (*E. Simon*) (probably in MCSN, Genoa).

Cataulacus granulatus race *andamanensis* Forel, 1903 : 406. Syntype workers, INDIA: Andaman Is. (MHN, Geneva) [examined]. **Syn. n.**

Worker. TL 3·8 – 4·1, HL 0·90 – 1·00, HW 0·90 – 1·04, CI 100 – 104, EL 0·36 – 0·40, OI 38 – 40, IOD 0·68 – 0·76. SL 0·48 – 0·50, SI 46 – 53, PW 0·72 – 0·80, AL 0·92 – 0·98, MTL 0·46 – 0·52 (6 measured).

Occipital crest complete or in some cases incomplete medially, armed with small denticles. Sides of head behind eyes minutely denticulate, terminating in a large denticle at the occipital corner. The head relatively long and narrow, with relatively large eyes. Lateral margins of alitrunk minutely denticulate along their length, the denticles spaced out and usually extending onto the lateral margins of the propodeal spines. Alitrunk broadest across the pronotum, the sides converging posteriorly in dorsal view; the alitrunk laterally without a pronounced U- or V-shaped notch or impression between the mesonotum and propodeum. Propodeal spines varying from a pair of distinct, relatively broad, short structures to a pair of small teeth. First gastral tergite not marginate laterally.

Head reticulate-rugose dorsally, the interspaces finely and quite feebly reticulate-punctate, dully shining. Pronotal dorsum reticulate-rugose, the points of intersection of the rugae often raised into minute peaks. On the mesonotum the rugae usually run longitudinally but in most specimens some feeble cross-meshes are visible which in some individuals may be strongly developed. Propodeal dorsum reticulate-rugose but more finely and densely so than the pronotum. The interspaces are always finely and weakly reticulate-punctate, dully shining. First gastral tergite reticulate-punctate with numerous weak longitudinal rugulae. The sides of the sclerite, above the tergosternal junction often have a number of coarse longitudinal rugae, but their development varies amongst individuals.

Dorsum of head with numerous short, distinctly and strongly clavate hairs which in some cases appear almost globular, with a short stem. Similar hairs are present upon the dorsal alitrunk but are more sparse, whilst upon the gaster the hairs are normal, short, thick, and blunt.

Female. TL 5·0, HL 1·02, HW 1·00, CI 98, EL 0·40, OI 40, IOD 0·78, SL 0·52, SI 52, PW 0·90, AL 1·40, MTL not measurable.

As worker but with reduced denticulation on the head and alitrunk. Propodeal spines proportionately smaller than in the worker, reduced to a pair of short, triangular teeth.

Sculpturation and form and distribution of hairs as worker, but the mesoscutum and scutellum longitudinally rugose, more regularly so upon the former than the latter where the rugae are somewhat sinuate. Gaster very much longer than broad, the first tergite 1·70 long and 1·04 wide at maximum in the female examined.

This small and quite distinctive species appears to be restricted to Ceylon and the Andaman Islands. The small size coupled with the relatively narrow head, large eyes and presence of clavate short hairs distinguishes the species from other members of the *granulatus*-group. The presence of clavate and subclavate hairs in some populations of *granulatus* from Java and the Andaman Islands is offset by size differences, differences in sculpturation, the presence of a constriction between mesonotum and propodeum and a marked difference in bodily build; *simoni* being a relatively slender species whilst *granulatus* is thick set and stocky.

Forel (1909*b* : 393) described the female and said that the gaster was twice longer than broad. Measurement of the female available for study showed that the gastral dimensions were not so extreme. The female is distinguished from that of *longinodus* by the presence of clavate hairs on the alitrunk, especially the pronotum, and its smaller size.

MATERIAL EXAMINED.

CEYLON: Laxapathiya, near Colombo (*K. L. A. Perera*); Peradenya (ex coll. *Donisthorpe*); Yakkala (*K. L. A Perera*); north Central Prov., Pollonaruwa (*K. L. A. Perera*).

THE *TAPROBANAE*-GROUP

The species of the *taprobanae*-group appear to have developed from a long-spined *granulatus*-like stock by the reduction of sculpture and reduction or complete loss of erect hairs from the dorsal surfaces of the body, particularly the head and alitrunk. The link between the two groups appears to be through *setosus* and *taprobanae*. In the last named species hairs are still relatively distinct, but in the closely allied *flagitiosus* they are very much reduced both in size and number. In *latus* some minute, flattened hairs may be present dorsally but in all other species they are completely lacking. Sculpturation is principally a fine, dense reticulate-puncturation which usually overlies any rugosity which may be present. A tendency of many species of the group is to replace the reticulate-rugulation of the mesonotum and propodeum by a regular series of low, longitudinal rugae which are more or less parallel. This is accomplished by the reduction or loss of the cross-meshes of the reticulum. In cases where this has occurred the resultant longitudinal rugae are very low and broad and their surfaces are covered by a dense reticulate-puncturation. Propodeal spines in all the species are well developed and relatively long and broad.

In the majority of species the occipital crest is well developed, although often not armed with denticles. The reduction in size and number of denticles on the crest and margins of the alitrunk appears to be correlated with the loss of erect hairs and reduction of the coarseness of the sculpturation in many species. Some species, especially those closest related to *reticulatus*, have the median portion of the occipital crest produced into a rectangular ridge which is quite distinct in full-face view.

The distribution of the group extends eastwards from India to the Philippines and to Sulawesi. No species seem to be present east of these islands and, strangely, the group is not known from Java and is but poorly represented on Sumatra. The greatest number of species are found on Borneo, in the territories of East Malaysia.

Cataulacus catuvolcus sp. n.

(Text-figs 4, 37)

Holotype worker. TL 4·8, HL 1·12, HW 1·32, CI 118, EL 0·44, OI 33, IOD 1·04, SL 0·60, SI 45, PW 1·10, AL 1·20, MTL 0·64.

Occipital crest well developed, sharp, not denticulate, shallowly concave. Sides of head behind eyes weakly denticulate, terminating at the occipital corner in a small, triangular tooth. Margins of frontal carinae sinuate, not jagged nor denticulate, the preocular tooth low and very broad. Lateral margins of pronotum uneven, not denticulate but with four or five small prominences which give the margin a minutely wavy appearance. Margins of mesonotum unarmed, with a narrow but conspicuous notch between the mesonotum and propodeum which gives the latter a short, free anterior face on each side. Sides of propodeum and outer margins of the spines with a few small prominences, the spines themselves long, broad basally and tapering to an acute apex. Petiole subconical in profile, the anterior face sloping steeply backwards and meeting the confluent, sloping dorsal and posterior face in an acute angle. This angle is visible as a weak transverse ridge in dorsal view, with a short and steeply sloping face in front and a longer and more gradually sloping face behind. Sides of first gastral tergite marginate throughout their length.

Head and body everywhere finely and densely reticulate-punctate, this sculpturation overlying any rugation which is present. Dorsum of head with a fine, rather loose rugoreticulum, faint traces of which also occur on the pronotal dorsum. The remainder of the dorsal alitrunk is equipped with numerous low, rounded, regular and virtually parallel longitudinal rugae which do not extend onto the propodeal declivity. Dorsum of first gastral tergite with numerous short, faint longitudinal rugulae, more obvious towards the sides of the sclerite than on the disc.

Dorsal surfaces of head and alitrunk without erect hairs, but the margins of the frontal carinae and of the head behind the eyes support a row of laterally projecting, short hairs. Lateral margins of alitrunk with a few short, very small hairs. Dorsal surfaces of legs, postpetiole and posterior half of first gastral tergite with erect hairs, often minute.

Paratype workers. TL 4·2 – 4·8, HL 1·06 – 1·14, HW 1·26 – 1·32, CI 114 – 119, EL 0·42 – 0·46, OI 33 – 35, IOD 0·98 – 1·04, SL 0·54 – 0·60, SI 43 – 45, PW 0·98 – 1·10, AL 1·16 – 1·22, MTL 0·58 – 0·64 (7 measured).

As holotype but with the pronotal sculpturation somewhat variable. In most the rugoreticulum is more or less distinct, but the cross-meshes may be effaced or partially effaced, leaving the sclerite longitudinally sculptured as the remainder of the dorsal alitrunk. In many specimens the longitudinal rugae of the dorsum tend to continue for a short distance onto the propodeal declivity.

Paratype females. TL 5·1 – 6·0, HL 1·12 – 1·24, HW 1·30 – 1·40, CI 113 – 116, EL 0·44 – 0·48, OI 32 – 34, IOD 1·04 – 1·10, SL 0·56 – 0·60, SI 42 – 43, PW 1·18 – 1·30, AL 1·46 – 1·60, MTL 0·68 – 0·70 (3 measured).

As worker but denticulation of sides of head further reduced. Pronotum and propodeum constructed much as in worker but the spines of the latter proportionately shorter and broader. Lateral margination of the first gastral tergite absent or with the side portions of the sclerite meeting the dorsum in an obtuse angle. Sculpturation of head as in worker, pronotum longitudinally rugose with some reticulation at the sides. Mesoscutum with a faint, regular, more or less parallel longitudinal rugulation. The rest of the alitrunk similarly but more coarsely sculptured, usually with some weak cross-meshes on the scutellum and with the rugae diverging on the propodeum.

Paratype males. TL ca 5·1, HL 0·84 – 0·90, HW 1·06 – 1·10, CI 118 – 130, EL 0·40 – 0·42, OI 36 – 40, IOD 0·82 – 0·88, SL 0·50 – 0·52, SI ca 47, PW 0·90 – 0·98, AL 1·36 – 1·50, MTL 0·66 – 0·70 (2 measured).

Occipital crest sharp and distinct, unarmed. Sides of head behind eyes denticulate, the occipital corners with a small tooth. Frontal groove visible as a polished strip of cuticle, not reaching the median ocellus. Sides of pronotum and propodeum irregular but without denticles; propodeal spines strongly developed, broad and acute. Notauli almost or quite absent. In the larger specimen the path of the anterior arms is visible, but in the smaller only a very weak indentation marks their former position; the posterior arm is not developed. Sides of first gastral tergite marginate for about two thirds of their length, the margination most distinct anteriorly, gradually fading out behind. Sculpturation of dorsal surfaces of head and alitrunk a fine rugoreticulum with punctate interspaces, the rugae tending to have a longitudinal direction on the scutum. Gaster and the strongly sclerotized apical portions of the parameres finely reticulate-punctate.

Holotype worker, PHILIPPINES: Romblon Island, 2.v.1924 (*J. W. Chapman*) (MCZ, Boston).

Paratypes. 8 workers, 3 alate females (one with gaster missing) and 2 males, with same data as holotype (MCZ, Boston; BMNH).

The species belongs to the small complex in the *taprobanae*-group centring on *reticulatus*. It is distinguishable from *reticulatus* and its immediate allies by the combined presence of a sharp occipital crest which is not raised medially, a marginate first gastral tergite, and by the form of the sculpturation upon the dorsal alitrunk.

The type-series is from Romblon Is. but it seems that the species is also present upon Luzon as a damaged male from Benguet, Luzon Is. collected by C. F. Baker is almost certainly referable to this species.

***Cataulacus chapmani* sp. n.**

(Text-fig. 30)

Holotype worker. TL 4·9, HL 1·14, HW 1·34, CI 118, EL 0·42, OI 31, IOD 1·08, SL 0·60, SI 45, PW 1·06, AL 1·34, MTL 0·66.

Occipital crest absent, the vertex not separated from the occiput. Sides of head behind eyes denticulate, the occipital corners with a small, broad but low triangular tooth. Margins of frontal carinae arcuate, not crenulate nor denticulate; preocular tooth small and very broad basally. Margins of alitrunk not denticulate except for a single very small prominence upon the outer margin of each propodeal spine, on its apical half. Mesonotum separated from propodeum by a narrow but distinct notch or constriction. Propodeal spines long, tapering and acute apically. Petiole in profile with the steeply back-sloping anterior face meeting the sloping dorso-posterior face in an acute angle which is visible as a transverse ridge in dorsal view. Sides of first gastral tergite not marginate.

Sculpturation of a fine dense reticulate-puncturation everywhere which overlies any rugulation which may be present. Head finely reticulate-rugose, the cross-meshes tending to fade out in front of the level of the anterior margins of the eyes so that only the longitudinal component remains. Dorsum of pronotum reticulate-rugose but the remainder of the dorsal alitrunk with only fine, low, regular and more or less parallel longitudinal rugae. Upper part of propodeal declivity between the spines with one or two weak, transverse rugae, the remainder reticulate-punctate only. First gastral tergite with a very close and fine reticulate-puncturation and numerous short, irregular longitudinal rugulae.

Dorsal surfaces of head and alitrunk without erect hairs but the margins of the former with some minute hairs projecting laterally. Margins of alitrunk also with a few minute, projecting hairs. Dorsal surfaces of legs and gaster with scattered small hairs, best seen on the apical third of the latter.

Paratype workers. TL 4·4 – 4·8, HL 1·04 – 1·16, HW 1·26 – 1·36, CI 117 – 121, EL 0·40 – 0·42, OI 30 – 32, IOD 1·02 – 1·10, SL 0·56 – 0·60, SI 44 – 45, PW 1·00 – 1·10, AL 1·20 – 1·38, MTL 0·60 – 0·68 (10 measured).

As holotype but some show the development of two or three low, blunt denticles upon the pronotal margin. In one of the smaller specimens erect hairs are completely absent from the first gastral tergite and the transverse rugae of the upper portion of the propodeal declivity may be very faint or even absent.

Paratype males. TL 4·6 – 4·8, HL 0·96 – 1·00, HW 1·14 – 1·16, CI 116 – 119, EL 0·38 – 0·40, OI 33 – 35, IOD 0·94 – 0·98, SL ca 0·54, SI 46 – 47, PW 0·96 – 0·98, AL 1·52 – 1·60, MTL ca 0·70 (2 measured).

Occipital crest absent, sides of head behind eyes denticulate. Occipital corners with a well developed, broadly triangular tooth. Frontal groove indistinct, not reaching the median ocellus. Margins of pronotum and propodeum irregular but not denticulate, the propodeal spines very short and broad, blunt apically. Notauli completely absent or with a very weak impression marking the position of the anterior arms. First gastral tergite not marginate laterally. Head finely reticulate-rugose, the interspaces reticulate-punctate, and with the cross-meshes tending to disappear in front of the level of the eyes so that only the longitudinal component remains. Dorsal surfaces of pronotum and propodeum and the scutellum reticulate-rugose and punctate, the scutum more definitely longitudinally rugose but with some feeble cross-meshes. Gaster and the apical portions of the parameres finely and densely reticulate-punctate. Distribution of hairs as in worker.

Holotype worker, PHILIPPINES: Negros Island, Dumaguete, 30.iv.1924 (*J. W. Chapman*) (MCZ, Boston).

Paratypes. 14 workers, same data as holotype (MCZ, Boston; BMNH; USNM, Washington). 2 males, same data as holotype but without date of collection and stating '500 ft' (MCZ, Boston). 1 worker, same locality and collector as holotype but dated 28.iv.32 (MCZ, Boston). 1 worker and 1 male, same data as holotype but undated and bearing the number '405' (BMNH). 1 worker, PHILIPPINES: Luzon Island, Lamao, no further data (MCZ, Boston).

Closely related to *reticulatus* and its immediate allies, *chapmani* is separated by its lack of an occipital crest, which is present in other species of the complex. The sculpturation of the alitrunk approximates closely to that of *catuvolcus* but this species has a marginate first gastral tergite as well as a distinct occipital crest.

Cataulacus flagitiosus F. Smith

(Text-figs 31, 34)

Cataulacus flagitiosus F. Smith, 1862 : 49. Holotype worker, SULAWESI: Tondano (*A. R. Wallace*) (UM, Oxford) [examined].

Worker. TL 4·6 – 4·8, HL 1·10 – 1·12, HW 1·30 – 1·34, CI 116 – 122, EL 0·40 – 0·42, OI 29 – 32, IOD 0·98, SL 0·62, SI 46 – 47, PW 1·12 – 1·20, AL 1·28 – 1·33, MTL 0·65 – 0·68 (2 measured).

Sides of head behind eyes denticulate, the occipital corner with a subtriangular tooth. Occipital crest complete, with a relatively large first (outer) denticle, mesad of which is a small gap followed by a row of minute denticles which are situated upon a long and very low median projection of the margin, similar to that seen in *reticulatus* but much reduced. Pronotum on each side with the lateral margination extended as a broad flange, denticulate on its outer edges and notably broader than the part of the pronotum in front of it or the mesonotum behind. Sides of mesonotum and propodeum not marginate, without denticles. In profile the promesonotum forming an even convexity which meets the dorsal surface of the propodeum in a short but distinct step, the propodeal dorsum being on a lower level than that of the promesonotum. Propodeal spines long, strong and divergent, each as long as the complete distance separating it from its twin; the outer margins of the spines not denticulate. Base of gaster marginate, the margination continued onto the sides but fading out posteriorly.

Dorsum of head with a coarse but somewhat effaced rugoreticulum which shows a longitudinal direction, particularly on the median portion; the whole overlaid by a fine and dense reticulate-puncturation. Alitrunk similarly sculptured dorsally, the rugoreticulum distinct only upon the pronotum, grading out posteriorly to a series of faint, regular longitudinal rugae which traverse the mesonotum. Propodeal dorsum with a faint rugoreticulum; the whole alitrunk covered with a fine dense reticulate-puncturation. Propodeal declivity with a few transverse rugae. First gastral tergite with irregular and often broken longitudinal rugulae and a dense reticulate-puncturation.

Dorsa of head, alitrunk and gaster with a few scattered, very short, thick hairs; the margins of these regions with small hairs which project laterally.

Known only from Sulawesi, this species has been recorded in the literature on two occasions; the type collection from Tondano and two collections made by Beccari at Makasar and Kandari, reported by Emery (1887 : 470). The species is characterized by the presence of prominent pronotal lobes or flanges; nothing is known of its biology.

Cataulacus latissimus Emery

(Text-fig. 28)

Cataulacus latissimus Emery, 1893*b* : 215, pl. 8, fig. 10. Syntype workers, WEST MALAYSIA: Perak (*Bedot & Pictet*) (probably in MCSN, Genoa).

Cataulacus latissimus var. *mimula* Menozzi, 1923 : 210. Syntype workers, BORNEO: Brunei (*Staudinger & Bang-Haas*) (probably in IE, Bologna). **Syn. n.**

Worker. TL 6·0 – 8·0, HL 1·50 – 1·64, HW 2·16 – 2·40, CI 144 – 146, EL 0·48 – 0·54, OI 22 – 23, OID 1·76 – 1·90, SL 0·86, SI ca 36, PW 1·86 – 2·20, AL 1·60 – 1·98, MTL ca 1·02 (2 measured).

Head massive, obviously much broader than long, the eyes relatively small. Occipital crest complete, sinuate with the median portion concave, and with a series of denticles along its length. Sides of head behind eyes denticulate and terminating in a subtriangular tooth at the occipital corners. Pronotum very broad, margined anteriorly by a small, raised ridge and laterally by a pair of large, flange-like expansions, the borders of which are denticulate. Mesonotum laterally with an apically bifurcate tubercle. Propodeum and basal half of the spines expanded laterally, the expanded portion denticulate along the edges. The apical halves of the spines smooth and tapering to an acute point. Promesonotal suture effaced, but its track marked by a very poorly defined impression in large workers. Also in larger workers the path of the metanotal groove may be picked out by a strip of more polished cuticle. First gastral tergite marginate around the entire circumference, strongest anteriorly and anterolaterally, less strong but still distinct elsewhere.

Sculpturation of head a fine and dense rugoreticulum with reticulate-punctate interspaces, the rugae tending to fade out anteriorly. Sculpturation of alitrunk and gaster similar to that of head, with the rugulae of the pronotum and first gastral tergite finer than those of the remainder of the alitrunk or pedicel.

Hairs absent from dorsal surfaces of head, alitrunk and gaster but present on the pedicel and around the margins of the aforementioned areas, and also upon the appendages.

Putative male. TL 7·2, HL 1·36, HW 1·74, CI 128, EL 0·48, OI 28, IOD 1·46, SL 0·80, SI 46, PW 1·54, AL 2·21 .

Occipital crest complete, shaped and armed as in the worker. Sides of head behind eyes denticulate, without a separate larger tooth at the occipital corner. Head distinctly broader than long, the eyes relatively larger than in the worker. Pronotum expanded laterally into a rounded flange on each side, the margins of which are denticulate and distinctly overhang the lateral portions of the sclerite. Anterior margin of pronotum with a low, transverse ridge which is broken medially. Anterior arms of notauli well developed and cross-ribbed, the posterior arm represented by a broad and shallow longitudinal groove. Parapsidal furrows present on the posterior half of the scutum. Propodeal spines distinct, short and broad. Gaster marginate laterally to the level of the spiracle of the first tergite, behind which it fades out. Spiracle of the first tergite borne upon a small tubercle, and the edge of the gaster between this and the base with two or three small denticles.

Head finely reticulate-rugose, more finely so on the anterior half where the cross-meshes are largely incomplete or absent and the rugae more or less longitudinal. Some broader, coarser rugae originate at the inner margin of each eye and run posteromedially to the occipital crest. Interspaces of the rugoreticulum finely and densely reticulate-punctate. Alitrunk with a rugoreticulum over the entire dorsum, finest on the pronotum, considerably more coarse on the propodeum and with reticulate-punctate interspaces. First gastral tergite with some basigastric costulae and a few weak, broken longitudinal rugae which do not extend onto the posterior half of the segment. Otherwise the gaster entirely reticulate-punctate. All dorsal surfaces of the head, body and appendages with erect, stout hairs.

By virtue of its large size, extremely broad head, laterally expanded pronotum, strongly marginate gaster and lack of hairs upon the dorsal surfaces of the head and body, the worker of this species is unlikely to be confused with any other. Menozzi's variety *mimula* shows only slight differences in sculpturation and is stated to be somewhat larger than the type, but the length given falls within the range quoted for workers, above. The range of the species includes East and West Malaysia and Singapore. It has also been recorded from Sumatra by Forel (1912 : 69).

MATERIAL EXAMINED.

SINGAPORE: (*Baker*). BORNEO: Kuching (*J. Hewitt*); Sandakan (*Baker*).

Cataulacus latus Forel

(Text-fig. 2)

Cataulacus latus Forel, 1891***a*** : 144. Syntype males, INDIA: Poona, 16.vi.1890 (*R. C. Wroughton*) (MHN, Geneva) [examined].

Note on the types. Although Forel only made mention of the male in his original description of this species, the type-series (in MHN, Geneva) also includes three females with the same data as the males. These males and females bear a red 'typus' label and this is most probably the series referred to by Wroughton (1892 : 178) as '120. *Cat. latus* (Forel MS). Poona Dists. 14.6.90, worker, male, female'. The workers from this series appear to be lost and there is a two day discrepancy in the data label date on the specimens from that given by Wroughton. However, this must be considered as the complete type-series.

Bearing yellow 'cotypus' labels are three females and three workers from Kanara, LVI/6 (*Wroughton*) and three more males from Poona (*Wroughton*). Three more workers from this Kanara series are in USNM, Washington bearing a red 'cotype' label and a note stating 'not a type?' signed M.R.S. (M. R. Smith?). These specimens from series LVI/6 are not types, in any sense of the word.

Worker. TL 5·4 – 7·5, HL 1·38 – 1·74, HW 1·66 – 2·23, CI 120 – 131, EL 0·36 – 0·46, OI 19 – 22, SL 0·68 – 0·82, SI 37 – 41, IOD 1·36 – 1·82, PW 1·28 – 1·86, AL 1·42 – 2·00, MTL 0·90 – 1·18 (10 measured).

Frontal groove usually distinct from the apex of the frontal triangle to the level of the anterior margins of the eyes, its track marked by an impression or a polished strip of cuticle. Occipital crest marked out by a row of denticles of which the first (outer) is the largest, often as large as the denticle at the occipital corner. The crest is usually incomplete medially, and this gap appears to be relatively broader in smaller individuals than in larger ones. Sides of head behind eyes denticulate. Eyes relatively small; ocelli usually absent but one or two may be developed. Lateral margins of pronotum denticulate, also with one or two denticles on the mesonotal and propodeal margins and on the outer edges of the propodeal spines. A break in denticulation coupled with a V- or U-shaped impression is present between pro- and mesonotum and the latter and the propodeum in dorsal view. Propodeal spines well developed. Gaster not marginate laterally.

Sculpturation of head basically a fine, dense reticulate-puncturation with scattered larger punctures distributed over the frons and vertex. Behind the eye and between it and the occipital corner a fine rugoreticulum is present. Dorsum of alitrunk finely longitudinally rugose or reticulate-rugose, with an overlying fine, dense reticulate-puncturation. Gaster finely and densely reticulate-punctate with numerous very fine, broken longitudinal rugulae.

Dorsal surfaces of head and alitrunk without hairs or (usually) with a few minute, flattened hairs, not easily seen. Lateral margins of head and alitrunk with short, blunt hairs, also present on the pedicel, gaster and appendages.

Female. TL 9·2 – 10·4, HL 1·84, – 1·90, HW 2·10 – 2·20, CI 110 – 119, EL 0·46 – 0·50, OI 21 – 24, IOD 1·74 – 1·82, SL ca 0·84, SI ca 39, PW 1·90 – 2·04, AL 2·60 – 2·84, MTL 1·16 – 1·23 (6 measured).

Similar to worker but with the frontal groove better developed, usually distinct to the level of the anterior ocellus. Denticles of the occipital crest indistinct except for the first (outermost) in the series on each side; the denticles of the sides of the head behind the eyes very much reduced or absent. Sculpturation of head as worker but with distinct rugae behind the eyes. Mesoscutum and scutellum with rather coarse but flattened longitudinal rugae overlaid with a fine, dense reticulate-puncturation. Propodeal spines much reduced. Arrangement of hairs similar to worker but the dorsum of the pronotum with short hairs present, particularly in a transverse row just anterior to the promesonotal suture.

Male. TL 6·0 – 7·0, HL 1·14 – 1·26, HW 1·34 – 1·60, CI 117 – 131, EL 0·40 – 0·44, OI 26 – 29, IOD 1·16 – 1·30, SL 0·68 – 0·76, SI 45 – 50, PW 1·22 – 1·45, AL 1·84 – 2·14 (3 measured).

Frontal groove distinct as strip of polished cuticle running from the apex of the frontal triangle to the anterior (median) ocellus. Sides of head behind eyes denticulate, terminating in a larger tooth at the occipital corner. Mesad of this lie the denticles marking the occipital crest, the first being distinctly the largest of the series. Anterior arms of notauli distinct, with coarse cross-ribs, the spaces between which are shiny. Posterior arm less well developed. Parapsidal furrows present on the posterior half of the sclerite as polished strips of cuticle. Margins of pronotum jagged; propodeal spines absent, replaced by a pair of acute angles. Dorsum of head, alitrunk and petiole with a fine rugoreticulum, the interspaces sharply and densely reticulate-punctate; the rugoreticulum best defined on the head, propodeum and petiole, less distinct on the thorax proper. Gaster finely and densely reticulate-punctate with a few radiating basigastric costulae. Parameres dorsoventrally flattened, the exposed portions smooth and shiny. Dorsal surfaces of head, alitrunk and gaster equipped with erect hairs.

The large size, relatively small eyes and broad head serve to distinguish this species from others of the *taprobanae*-group. It also differs by the presence of a frontal groove and is separable from its closest relative, *latissimus*, by the absence of gastral margination and flange-like lateral expansions of the pronotum. Apparently all that is known of the biology of this interesting species is the report of Wroughton (1892) that the species nests in hollow tree branches and that the nest which he examined contained 'the pupae of some kind of *Lycaena* (?)' which he was unable to rear through to the imago.

MATERIAL EXAMINED.

INDIA: Travancore, Tenmalai (?); no data (ex coll. *Forel*); Bengal, Orissa (*Taylor*); Bengal, Pusa (*G. D. R.*); Kerala State, Nilambur (*A. B. Soans & W. L. Brown*); no data (*G. B. King*); Poona (*Wroughton*); South Mysore (*H. L. Andrews*); Haldwani Dist., Kumaon (*H. G. Champion*); Savantvadi State (*J. C. Bridwell*); Bombay (*J. C. Bridwell*). BURMA: Pegu (ex coll. *Bingham*).

Cataulacus praetextus F. Smith

(Text-fig. 36)

Cataulacus praetextus F. Smith, 1867 : 528, pl. 26, fig. 5. Holotype worker, BORNEO (UM, Oxford) [examined].

Cataulacus praetextus var. *sumatrensis* Forel, 1912 : 60. Holotype worker, SUMATRA: Indrapura (*Tritschler*) (MHN, Geneva) [examined]. **Syn. n.**

Worker. TL 5·2 – 6·0, HL 0·90 – 1·04, HW 0·94 – 1·10, CI 104 – 106, EL 0·36 – 0·40, OI 36 – 38, IOD 0·72 – 0·80, SL 0·48 – 0·52, SI 47 – 51, PW 0·76 – 0·92, AL ca 1·00, MTL 0·48 – 0·52 (2 measured).

Occipital crest complete, the median portion raised into a low, projecting ridge in full-face view; entirety of crest without denticles. Sides of head behind eyes denticulate, sometimes not very distinctly so, the occipital corners with a low, broad, triangular tooth. Sides of pronotum with a rectangular shallow expansion, the margins of which have one or two feeble teeth or crenulations anteriorly. Sides of mesonotum roughly triangular in dorsal view, with a distinct U- or V-shaped notch or impression separating them from the propodeum. Propodeum behind this notch with a short free anterior face. Sides of propodeum marginate, continuous with the sides of the spines, the margins with three to five denticles. First gastral tergite marginate laterally throughout its length, the margination most distinct basally.

Dorsal surfaces of head and alitrunk with a fine rugoreticulum with the interspaces finely and densely reticulate-punctate. The sculpturation has approximately the same intensity on all parts of the dorsal alitrunk. Dorsal surfaces of pedicel similarly but more loosely sculptured;

the first gastral tergite finely and very densely reticulate-punctate with numerous short rugulae, the majority of which are longitudinal.

Dorsal surfaces of head, alitrunk and first gastral tergite without hairs. Hairs are, however, present on the mandibles and a row of short, flattened hairs adorns the margin of each frontal carina. Sides of head behind eyes with a row of very short, flattened hairs which project beyond the lateral margins in full-face view. Lateral margins of alitrunk with a few similar hairs. Dorsal surfaces of femora and tibiae without hairs except for one or two which may be present at the extreme apices of the latter.

Putative female. TL 5·2 – 6·0, HL 1·04 – 1·14, HW 1·14 – 1·30, CI 109– 114, EL 0·40 – 0·44, OI 35, IOD 0·82 – 0·94, PW 1·02 – 1·16 (2 measured).

Similar to worker, the median projecting portion of the occipital crest distinct. Denticulation of sides of head behind eyes less well developed; the expansions of the sides of the pronotum much reduced, with a small but distinct triangular tooth at the beginning of the lateral margination on each side. Propodeal spines smaller than in worker, the sides of the first gastral tergite not marginate. Sculpturation of head, pronotal dorsum, propodeum, pedicel and first gastral tergite as worker but the scutum and scutellum longitudinally rugose, the spaces between the rugae finely reticulate-punctate. Hairs distributed as in worker but one or two erect hairs may be present on the femora.

Putative male. TL 4·8 – 5·2, HL 0·86 – 0·88, HW 1·02 – 1·06, CI 118 – 120, EL 0·36 – 0·38, OI 34 – 37, IOD 0·78 – 0·84, SL ca 0·50, SI 47 – 49, PW 0·96 – 1·00, AL 1·56 – 1·61, MTL ca 0·72 (4 measured).

Occipital crest complete, unarmed, the median portion raised and projecting as in the worker. Sides of head behind eyes not denticulate, usually feebly sinuate. Occipital corners in the form of projecting, broad, triangular angles. Frontal groove distinct, not reaching the median ocellus. Sides of pronotum not expanded, without denticles. Anterior arms of notauli distinct at least anteriorly and with cross-ribs, the posterior arm indistinct or absent. Parapsidal furrows present. Propodeal spines broad basally, rapidly converging to an acute apex. First gastral tergite not marginate. Parameres in side view with a strong, thick brush of hairs ventrally.

Sculpturation somewhat variable. Head usually reticulate-punctate everywhere with a superimposed fine rugoreticulum posteriorly on the dorsum and fine, more definitely longitudinally directed rugulae anteriorly, the change in sculpturation taking place more or less at the level of the median ocellus. On the most finely sculptured individuals the rugulae are virtually absent from the anterior half of the head. Dorsum of alitrunk reticulate-punctate with sparse longitudinal rugulation on the mesonotal sclerites and a fine rugoreticulum upon the propodeum. Gaster very finely reticulate-punctate and dully shining. Erect hairs sparse everywhere but the second to fifth gastral tergites inclusive with a transverse row of many long, thick, blunt hairs, entirely absent from the first tergite.

Forel's variety *sumatrensis* is a very ordinary example of the worker of *praetextus*, without notable differences from the type of the species. *C. praetextus* is distinguished from its immediate congeners by the form of sculpturation, great reduction of hairs, especially on the legs, the laterally marginate first gastral tergite and the projection of the occipital crest. It appears to be closest related to *reticulatus* and *catuvolcus*. The male is distinguished by the rather odd bands of long thick hairs on each visible gastral tergite behind the first.

MATERIAL EXAMINED.

WEST MALAYSIA: Selangor, Gombak (?). BORNEO: Mt. Tobangs, 1700 m (*E. Mjoberg*); Mt. Dulit, 3000 ft (*E. Mjoberg*); Kuching (*J. Hewitt*).

Cataulacus reticulatus F. Smith

(Text-fig. 35)

Cataulacus reticulatus F. Smith, 1857 : 81, pl. 2, fig. 8. Holotype worker, BORNEO: Sarawak (*A. R. Wallace*) (UM, Oxford) [examined].

Cataulacus reticulatus var. *minor* F. Smith, 1857 : 81. Holotype worker, BORNEO: Sarawak (*A. R. Wallace*) (presumed lost). **Syn. n.**

Redescription of holotype worker. TL 4·2, HL 1·06, HW 1·26, CI 119, EL 0·40, OI 32, IOD 0·92, SL 0·54, SI 43, PW 0·98, AL not measurable, MTL 0·60

Occipital crest complete, the median portion raised into a low, posteriorly projecting ridge; the crest without denticles. Sides of head behind eyes crenulate-denticulate, terminating in a small triangular tooth at the occipital corners. Preocular tooth triangular, the frontal carinae in front of this at first shallowly concave, then convex over the antennal insertions. Frontal groove absent. Sides of pronotum with a marginate, subrectangular expansion which begins a short distance behind the anterior pronotal border. Sides of mesonotum convex, angular, separated from the propodeum by a distinct V-shaped impression. Propodeum behind this notch with a free anterior margin at each side, the lateral margins extremely shallowly concave and continuous with the outer margins of the spines. Propodeal spines long, well developed, broad at the base and tapering to an acute apex. Lateral borders of all constituents of the alitrunk neither crenulate nor denticulate; the dorsum devoid of sutures or sutural impressions. Petiole in profile with the anterior and posterior faces sloping and convergent dorsally so that there is no separated dorsal surface to the segment. Dorsum of postpetiole low and rounded. Subpetiolar process simple, with an acute posteroventral angle. Subpostpetiolar process low and subrectangular. First gastral tergite longer than broad, length ca 1·50, maximum width ca 1·28, the sides convex and narrowing posteriorly. Basal corners marginate, the margination scarcely extending onto the sides.

Entirety of dorsum of head and alitrunk with a fine rugoreticulum, the interspaces of which are finely and densely reticulate-punctate. First gastral tergite similarly but much more finely sculptured. Propodeal declivity predominantly reticulate-punctate with only a few very faint rugulae; the anterior face of the petiole similarly sculptured.

Erect hairs virtually absent, present only on the mandibles and antennal scapes. A few (four or five) very short, blunt hairs project beyond the margins of the frontal carinae in dorsal view; otherwise the margins of the head and alitrunk are without projecting hairs although one or two minute, flattened hairs may be present near the margins themselves. First gastral tergite without hairs; some are present on the sternites.

Emery (1889 : 507) suggested that *reticulatus* was not specifically different from *granulatus* and this view was endorsed in the catalogue of Dalla Torre (1893) who gave the former as a synonym of the latter name. There the situation rested until Donisthorpe (1932) overhauled the types created by F. Smith from the collections of A. R. Wallace. Donisthorpe re-examined the type of *reticulatus* and declared it a good species. Unfortunately he did not characterize the species and so up to the present time the only description available has been the unworkable original and the rather poor figure which accompanies it. The var. *minor* appears to have come from the same series as the type and was separated from it only by minor details of colouration, which make one suspect it of being merely a teneral form.

The true affinity of the species does not lie with *granulatus* but with the species of the *taprobanae*-group, particularly with *praetextus*, *catuvolcus* and *chapmani*, from which it is separable by the characters given in the key.

Cataulacus taprobanae F. Smith

(Text-figs 32, 33)

Cataulacus taprobanae F. Smith, 1853 : 225, pl. 20, fig. 10. Holotype worker, CEYLON: (*G. H. K. Thwaites*) (BMNH) [examined].

Worker. TL 4·1 – 5·4, HL 1·02 – 1·32, HW 1·26 – 1·50, CI 112 – 123, EL 0·42 – 0·48, OI 32 – 33, IOD 0·96 – 1·20, SL 0·54 – 0·70, SI 41 – 47, PW 1·02 – 1·32, AL 1·22 – 1·54, MTL 0·64 – 0·82 (10 measured).

Occipital crest complete or broken but always marked out by a series of denticles which decrease in size medially; those nearest the centre often minute. The crest itself shallowly concave across the width of the head. Sides of head behind eyes denticulate, the occipital corners with a small tooth which is, however, larger than the first denticle of the occipital crest. Sides of pronotum marginate, denticulate, but the sides of the mesonotum weakly or not marginate, with only one or two very small denticles. Propodeal spines long, stout and acute, divergent, the outer margins of the spines and the sides of the propodeum with a few minute denticles. First gastral tergite not marginate laterally.

Sculpturation of head and alitrunk primarily of a fine and dense reticulate-puncturation which overlies any rugulation present. The head with a fine loose rugoreticulum or with longitudinal rugae. Pronotum feebly reticulate-rugose, with the rugae tending to become longitudinal and less distinct posteriorly so that on the mesonotum the sculpturation is dominated by the puncturation and only a few feeble longitudinal rugulae are visible. Propodeum sculptured as mesonotum, the declivity usually with a few transverse rugae. First gastral tergite strongly reticulate-punctate with numerous weak longitudinal rugulae.

Dorsal surfaces of head, pedicel, first gastral tergite and appendages with numerous short, stout hairs, also present around the margins of the head and pronotum. Dorsum of alitrunk with a few scattered hairs only.

Female. TL 6·8 – 7·0, HL 1·40 – 1·44, HW 1·48 – 1·58, CI 105 – 109, EL 0·48 – 0·50, OI 32, IOD 1·24 – 1·40, SL ca 0·72, SI ca 45, PW 1·44 – 1·48, AL 1·96 – 1·98, MTL 0·82 – 0·86 (3 measured).

Similar to worker but occipital crest incomplete medially, the median section broadly concave. Denticulation of crest and the sides of the head much reduced. Sides of pronotum with a few small denticles, the sides of the propodeum irregular but not denticulate. Propodeal spines a pair of short, broad, triangular teeth. Sculpturation basically as in worker but with the rugoreticulum of the head and pronotum more pronounced, the scutum and scutellum longitudinally and quite regularly rugose. Distribution of hairs as in worker but those on the head are shorter and less distinct. A transverse row of short hairs is present on the pronotum just anterior to the promesonotal suture.

Male. TL 5·0 – 5·4, HL 1·04 – 1·12, HW 1·18 – 1·26, CI 111 – 117, EL 0·42 – 0·44, OI 34 – 35, IOD 0·98 – 1·04, SL 0·62 – 0·68, SI 49 – 54, PW 1·10 – 1·38, AL 1·72 – 1·82, MTL 0·80 – 0·84 (3 measured).

Occipital crest shallowly concave, usually complete but broken medially in some individuals. The crest denticulate, very feebly so medially, the largest denticles being those closest to the short, triangular occipital tooth. Sides of head behind eyes denticulate. Sides of pronotum irregular but not definitely denticulate. Notauli with only the anterior arms developed, and usually only the distal portions distinct and cross-ribbed; the posterior arm absent. Parapsidal furrows present. Propodeum with a pair of short but acute projecting teeth. Apical portions of parameres smooth and shining. Head and pronotum loosely reticulate-rugose, the rugae of the former raised into minute peaks at many of the points of intersection. Reticular interspaces finely and densely reticulate-punctate. Mesoscutum and scutellum finely longitudinally rugose, the gaster finely and densely reticulate-punctate with some basigastric costulae present. Hairs numerous on all dorsal surfaces, much more conspicuous than in the other castes.

One of the relatively few species to inhabit the Indian subcontinent, *taprobanae* is distinguished by its long, divergent propodeal spines, reduced sculpturation dominated by puncturation and the presence of short, erect hairs on the alitrunk. Bingham (1903 : 121) states that he always found the species on the bark or leaves of trees 'wandering about apparently in an aimless sort of way.' The female of the species was originally described by Forel (1909*b* : 393).

MATERIAL EXAMINED.

INDIA: Walajanagar (*A. P. Nathnu*); Kerala State, Kottiyoor, Wynaad Taluk (*A. B. Soans* and *W. L. Brown*); Kerala State, Cannanore Distr., Kannoth (*A. B. Soans* and *W. L. Brown*); Travancore, Tenmalai (?); Madras, Nilgiris Dist., 3,500 ft (ex coll. *Donisthorpe*); Savantvadi State (*J. C. Bridwell*); Goa, Moramuga (*J. C. Bridwell*); Mangalore (*J. C. Bridwell*). CEYLON: Kandy (*Bingham*); N. Centr. Prov., Pollonaruwa (*K. L. A. Perera*); Gilimale, near Ratnapura (*E. O. Wilson*); Sawaragomuwa Prov., Belihulaya (*K. L. A. Perera*).

THE *INSULARIS*-GROUP

The single species placed in this group is characterized by a lack of margination on the alitrunk, great development of occipital and propodeal spines and the extreme coarseness of the sulpturation, especially on the alitrunk.

Whilst the hairyness of the species and the form of sculpture suggest affinities with the *granulatus*-group some characters are present which are reminiscent of the *guineensis*-group of species from the Ethiopian region, namely the large size, strong occipital and propodeal spines and the pronounced tubercle on the alitrunk, in the same position as the spine of *guineensis*.

Cataulacus insularis F. Smith

(Text-fig. 29)

Cataulacus insularis F. Smith, 1857 : 80, pl. 2, figs 4, 4a. Holotype male, BORNEO: Sarawak (*A. R. Wallace*) (UM, Oxford,) [examined].

Cataulacus horridus F. Smith, 1857 : 81, pl. 2, fig. 3. Holotype worker, BORNEO: Sarawak (*A. R. Wallace*) (UM, Oxford) [examined]. **Syn. n.**

Worker. TL 4·8 – 7·0, HL 1·22 – 1·62, HW 1·38 – 1·80, CI 111 – 113, EL 0·46 – 0·56, OI 31 – 32, IOD 1·08 – 1·36, SL 0·76 – 1·00, SI 49 – 56, PW 1·00 – 1·36, AL 1·44 – 1·94, MTL 0·84 – 1·15 (10 measured).

Occipital crest absent; occipital corners prolonged into a pair of massive, subtriangular, broad, acute spines. Sides of head behind eyes denticulate, the denticles also present on the outer edges of the occipital spines and occasionally on the inner edges also. Alitrunk not marginate laterally, the dorsum rounding into the sides, but with a distinct, rather massive, broad tubercle on each side at the level of the promesonotal junction which may represent the last vestige of an ancestral margination. In profile the promesonotum forming a more or less continuous convexity and with a distinct step posteriorly at its junction with the propodeum; the dorsum of the latter on a lower level than that of the former. Propodeum with a pair of very long spines, broad at the base and tapering to an acute apex. Mesokatepisternum developed into a large tuberculiform structure projecting laterally and visible in dorsal view. Gaster not marginate laterally.

Head reticulate-rugose, the interspaces reticulate-punctate. Dorsum of alitrunk very coarsely reticulate-foveolate with a fine reticulate-puncturation everywhere except the apical portions of the propodeal spines which are smooth and shiny. The sculpturation of the alitrunk is usually coarser and more rough-looking in larger individuals than in smaller. Gaster with a fine, dense rugoreticulum and reticulate-punctate interspaces, and usually also with a number of strong, longitudinal basigastric costulae.

All dorsal surfaces of head, alitrunk, gaster and appendages with numerous hairs.

Female. TL 6·8 – 7·5, HL 1·60 – 1·74, HW 1·80 – 2·00, CI 112 – 115, EL 0·52 – 0·60, OI 29 – 30, IOD 1·36 – 1·50, SL 1·02 – 1·08, SI 54 – 57, PW 1·60 – 1·70, AL 2·30 – 2·50, MTL 1·16 – 1·22 (3 measured).

As worker but the lateral tubercle of the alitrunk reduced to a low, broad swelling, less distinct than in the worker. A similar reduction is seen in the tubercle of the mesokatepisternum, whose apex is directed more anteriorly than in the above. Propodeal spines less well developed, very broad at the base, tapering rapidly to an acute apex. Sculpturation of head and pronotum as in worker, but the mesonotal sclerites and propodeal dorsum are longitudinally rugose; those on the propodeum diverging onto the basal parts of the spines.

Male. TL 6·4 – 6·6, HL 1·30 – 1·34, HW 1·42 – 1·58, CI 109 – 117, EL 0·48 – 0·50, OI 32 – 34, IOD 1·18 – 1·22, SL 0·88 – 0·90, SI 55 – 63, PW 1·30 – 1·32, AL 2·12 – 2·14, MTL 1·08 – 1·12 (2 measured).

Occipital spines proportionately as well developed as in worker, the sides of the head behind the eyes denticulate, as are the inner and outer borders of the occipital spines. Preocular tooth absent or reduced to a minute triangular prominence. Lateral tubercle of alitrunk not developed, but the tubercle of the mesokatepisternum distinct, directed forwards as in the female. Anterior arms of notauli distinct, the posterior arm reduced to a mere impression, not shining nor cross-ribbed like the anterior arms. Propodeal spines strongly developed, long and acute. Head reticulate-rugose with punctate interspaces, the rugae either longitudinal to the level of the posterior margin of the eyes and then becoming transverse, so that they form a broad arch around the ocelli, or irregularly distributed over the head.

One of the largest species of the Indo-Australian and Oriental regions and certainly one of the most easily recognizable, *insularis* is known from West Malaysia, Sumatra and Borneo. The great development of spines at the occipital corners and the lack of alitrunk margination immediately sets the species aside from its congeners. The species was described twice by F. Smith (1857) on consecutive pages of the same publication, once from a male and once from a worker. The synonymy was made by comparison of the two Smithian types with series from Borneo containing both castes, and it seems probable that both of Smith's species were described from a single series collected by Wallace.

Emery (1893*b* : 216) first noted the size variation of the species, mentioning a small worker from Perak, and Crawley & Jacobson (1924 : 401) described the female from Sibolga in Sumatra. In this description they mention that only the anterior ocellus was developed, whereas in all the females studied by the present author the lateral ocelli have also been present.

MATERIAL EXAMINED.

WEST MALAYSIA: Pahang, below the Gap, ca 850 m (*R. Crozier*); Perak (*Haviland*). BORNEO: Kuching (*J. Hewitt*); N. Borneo, Tutu River (*E. Mjoberg*); N. Borneo, Kaingaran River, Trus Madi Tr., 3900 ft (*P. W. Bryant*); N. Borneo, S. Tutu (*F. Mjoberg*); Sandakan (*Baker*); Sarawak, Mt. Poi (*E. Mjoberg*); W. Sarawak, Mt. Mating (*G. E. Bryant*); Sarawak (*Haviland*); Sarawak, Kapah River, tributary of R. Tinjar (*B. M. Hobby* and *A. W. Moore*). SUMATRA: Siantar, Pematang (*W. M. Mann*); Moeara Mahat (*W. M. Mann*).

THE FOSSIL SPECIES

Four species of *Cataulacus* are known only as fossils or from forms preserved in amber, these are:

anthracinus (Heer)	Radoboj Tertiary formations.
niger (Heer)	Radoboj Tertiary formations.
planiceps Emery	Sicilian Amber.
silvestrii Emery	Sicilian Amber.
resinosus Viehmeyer	Celebes Copal.

Apart from the last, which may not be a distinct species (see discussion below) these forms are from areas now well outside the range of the genus, in southern Europe. Although this revision is basically concerned with the living species of *Cataulacus* the following notes are added for completeness.

Cataulacus resinosus Viehmeyer **stat. n.**

Cataulacus taprobanae var. *resinosa* Viehmeyer, 1913 : 145. Syntype workers, SULAWESI: in copal.

This form was described from two specimens embedded in Celebes copal, originally deposited in the Zoological Museum, Dresden. Viehmeyer separated it from *taprobanae* on details of sculpturation and colouration, but in view of the fact that the range of *taprobanae* does not extend to Sulawesi and also that the copal is relatively recent it is probable that *resinosus* is not to be associated with that species at all. For this reason the variety has been given specific status provisionally, until a reassessment of the types can be made. At present the only living species known from Sulawesi is *flagitiosus*, and an examination of the *resinosus* types may show them to be synonymous with it.

Cataulacus silvestrii Emery

Cataulacus silvestrii Emery, 1891 : 147, pl. 1, figs 5–7. Holotype worker, SICILY: in Sicilian Amber (Museo. Mineral., Univ., Bologna).

In a number of ways *silvestrii* resembles *oberthueri* of Madagascar but in actuality is probably not directly related to that species. The single specimen known was very well described and figured by Emery, but some of the more salient features may be noted here.

CI approximately 100. The occipital corners are produced into a pair of long, acute and rather narrow spines, whilst running between them the occipital crest appears to be developed as an acute angle. Sides of head behind eyes lack denticles and the preocular tooth is absent. The eyes are of average size, OI about 37, as approximated from Emery's fig. 7. Pronotum weakly if at all marginate, the margins without denticles. Propodeal spines well developed. Petiole and postpetiole very long and narrow, apparently much more so than in any living species of the genus. Sculpturation everywhere is basically a rugoreticulum and the dorsal surfaces of the head and body possess short, erect hairs. TL was given by Emery as 5·0.

Cataulacus planiceps Emery

Cataulacus planiceps Emery, 1891 : 148, pl. 1, figs 8, 9. Syntype workers, SICILY: in Sicilian Amber (Museo. Mineral., Univ., Bologna).

This second species from the Sicilian amber is much more similar to the common smaller African species of the present day than is *silvestrii*. Its affinities appear to lie with *pygmaeus* and its allies but without a review of the types this is of course mere conjecture.

TL given as 4·2. Occipital corners armed with a single spine; the occipital crest apparently developed as an acute angle and perhaps with a few denticles upon it laterally (these are shown in Emery's fig. 8 but not in fig. 9). Sides of head behind eyes crenulate; preocular tooth apparently absent. Alitrunk marginate, denticulate upon the margins. Propodeal spines short but acute. Segments of pedicel massive. Head and alitrunk reticulate-rugose with reticulate-punctate interspaces. Short hairs numerous on all dorsal surfaces.

Although I have only Emery's original descriptions and figures to work from the idea has occurred to me that the two specimens represented by the name *planiceps* may in fact be two closely related but separate species. It seems to me that the two figures, 8 and 9 of Emery, are each of one of the available specimens, and some interesting differences are noticeable between the two. For instance, although the two figures are drawn to the same scale (25 to 1) the head in fig. 8 is much longer than in fig. 9, even after allowance has been made for the difference in total length between the two (i.e. 0·2 mm) and the different angle at which they are drawn. The occipital spines of fig. 8 are smaller than those of fig. 9 and the spine visible in the former is flanked upon the occipital margin by a row of denticles, which are absent from the latter. In fig. 9 a large triangular plate or prominence projects from below the anterior third of the length of the eye and the posterior portion of the frontal carinae; this is not indicated at all in fig. 8.

Although these differences seem minor and may be due to omissions on Emery's part they are characters which have proved to be relatively consistent in other parts of the genus. A re-examination of the types would probably quickly prove or disprove the above comments.

Cataulacus anthracinus (Heer)

Attopsis anthracina Heer, 1850 : 156, pl. 12, fig. 12. Holotype male, YUGOSLAVIA: Radoboj, Tertiary formations.

Cataulacus anthracina (Heer) Mayr, 1867 : 58 [in text].

Attopsis nigra Heer, 1850 : 157, pl. 12, fig. 13. Holotype female, YUGOSLAVIA: Radoboj, Tertiary formations. Synonymy by Mayr, 1867 : 58 [in text].

Some of the ants described by Heer (1850; 1867) from Öhningen and Radoboj Tertiary formations were reviewed by Mayr (1867). In this publication Mayr pointed out that *nigra* was to be identified as a *Cataulacus* species and that he identified *anthracina* with the former species. Although no formal statement of synonymy was made this appears to have been the intention and was recorded as such in the catalogue of Dalla Torre (1893 : 137). All the specimens discussed were more or less fragmentary, and as Heer used a number of form-genera containing numerous unrelated forms a review of his material is to be desired.

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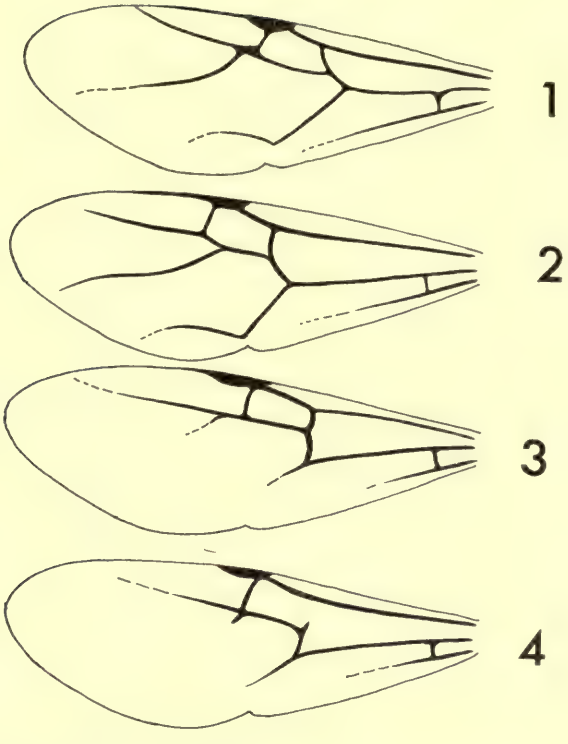
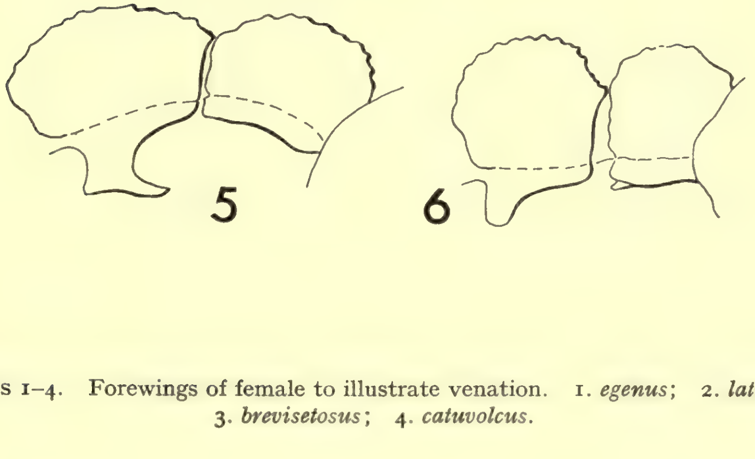
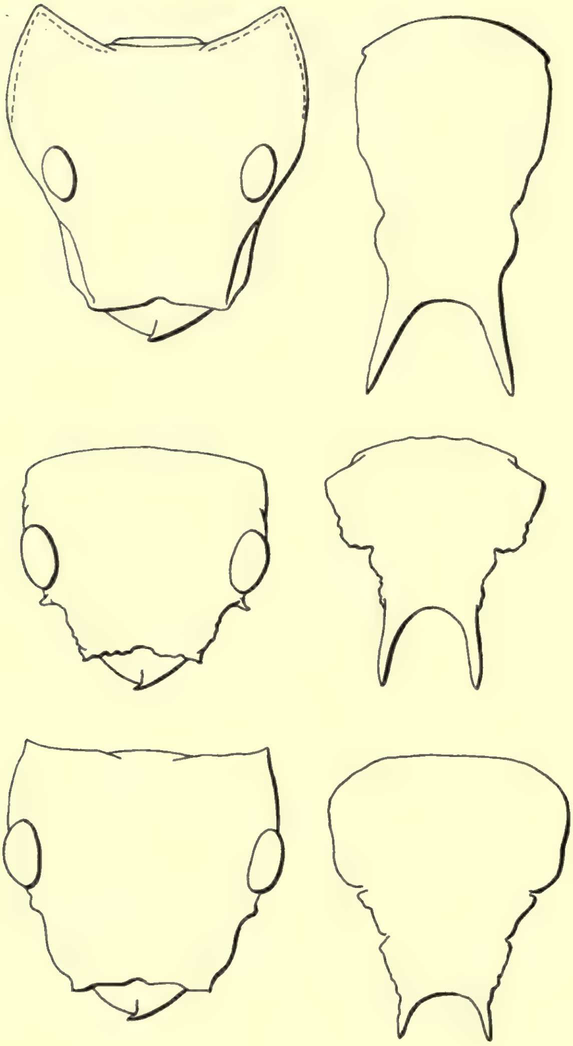


Figs 1–4. Forewings of female to illustrate venation. 1. *egenus*; 2. *latus*; 3. *brevisetosus*; 4. *catuvolcus*.



Figs 5, 6. Profile of pedicel in workers to illustrate development of subpetiolar process. 5. *hispidulus*; 6. *granulatus*.



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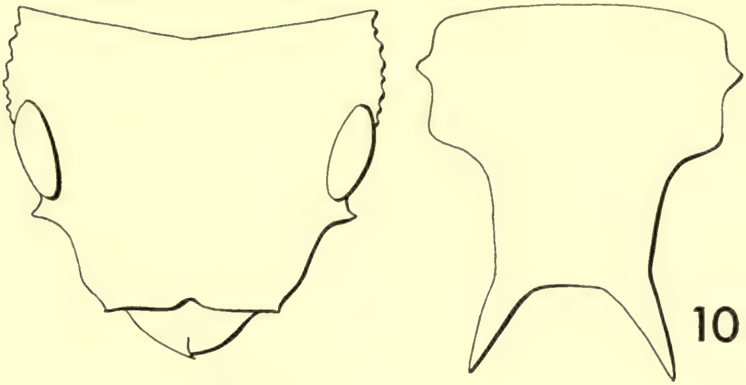
FIGS 7–9. Outline of head and dorsal alitrunk of 7. *oberthueri*; 8. *kohli*; 9. *lobatus* workers. Pilosity, etc., omitted.



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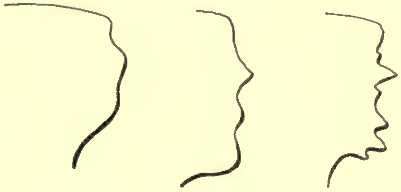

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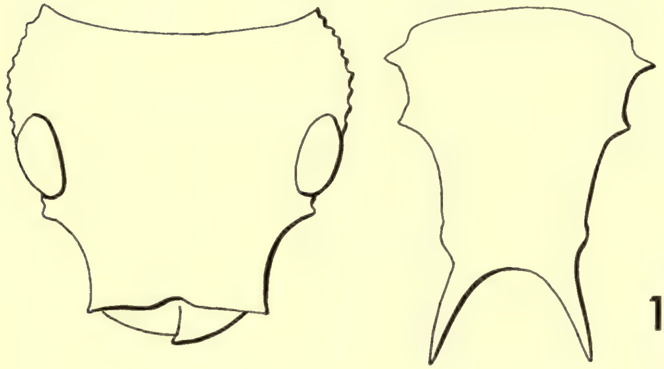

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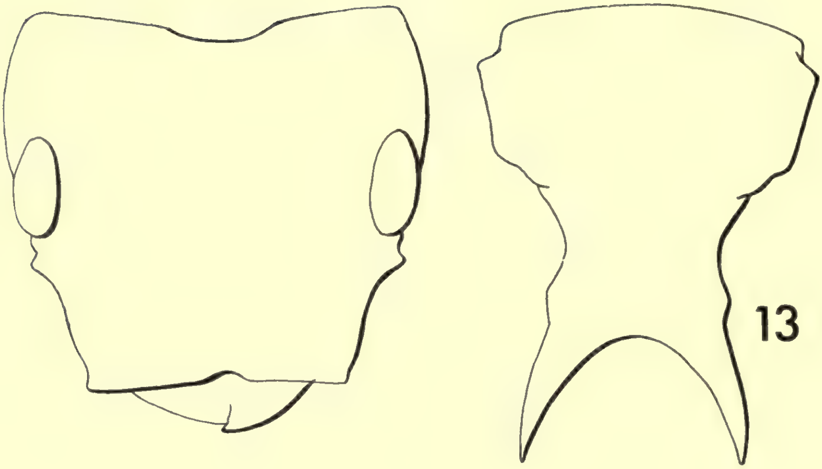
FIG. 10. Outline of head and dorsal alitrunk of *huberi* worker.

FIG. 11. Outline of pronotal margin of *huberi* worker to show variation in development of teeth.

FIG. 12. Outline of head and dorsal alitrunk of *pullus* worker.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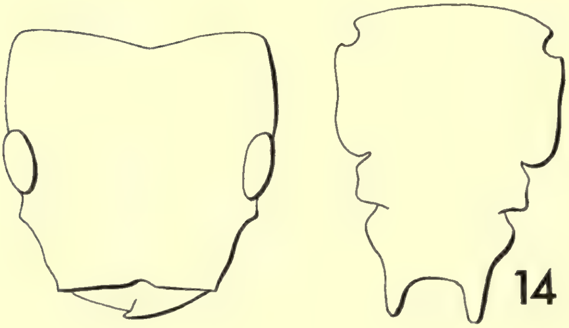
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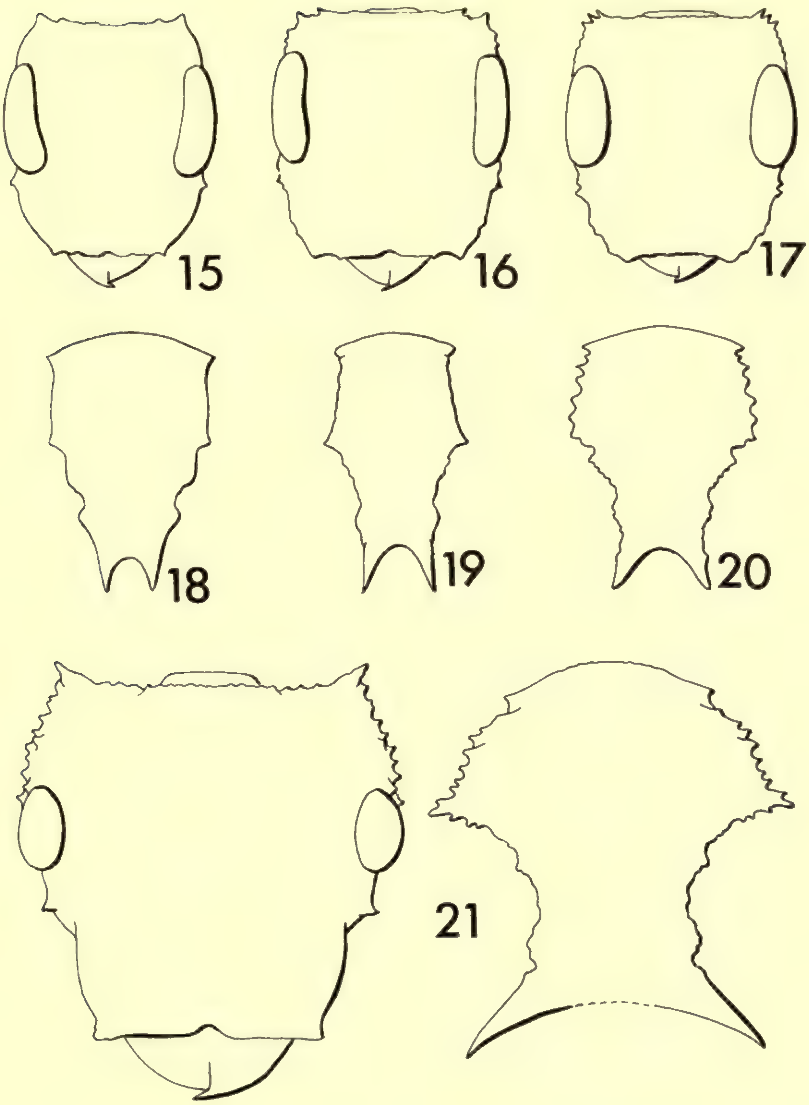
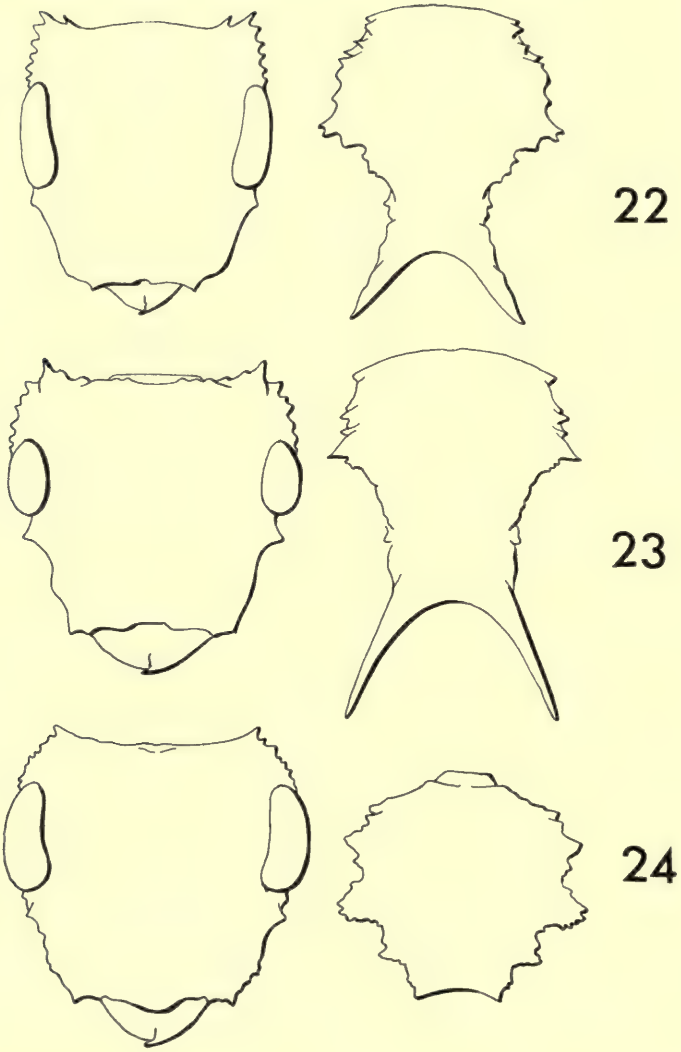
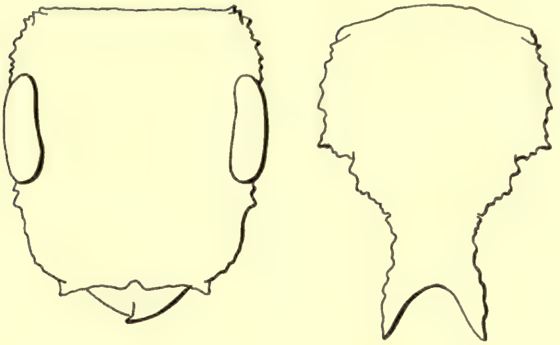
Figs 13, 14. Outline of head and dorsal alitrunk of 13. *tardus* (large worker); 14. *regularis*.



Figs 15–21. Outline of head and dorsal alitrunk of 15, 18. *adpressus* sp. n., holotype worker; 16, 19. *vorticus* sp. n. holotype worker; 17, 20. *brevisetosus*; 21. *erinaceus*.



FIGS 22–24. Outline of head and dorsal alitrunk of 22. *greggi* sp. n., paratype worker; 23. *guineensis*; 24. *mocquerysi*.



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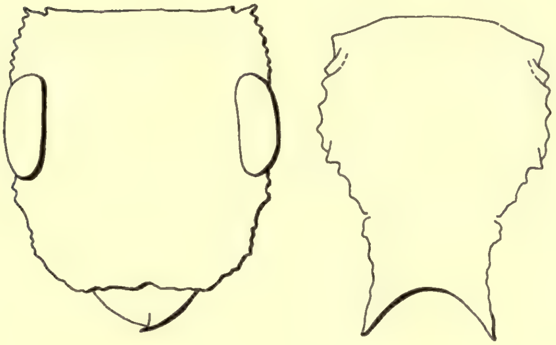

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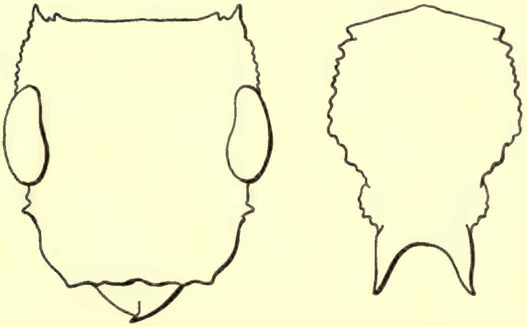

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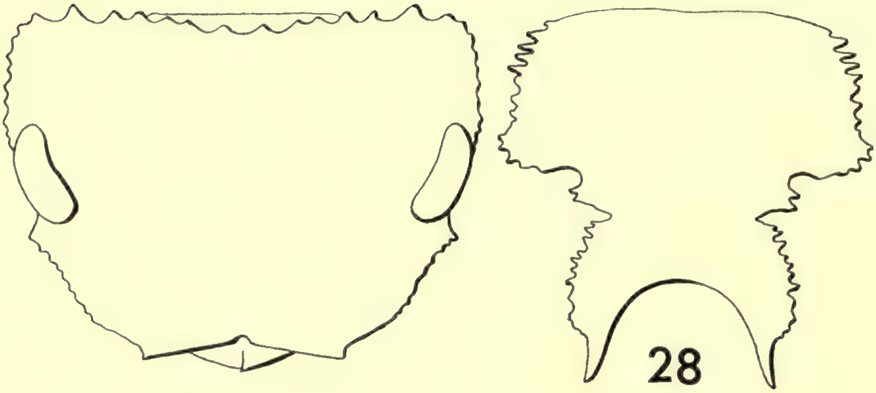
FIGS 25–27. Outline of head and dorsal alitrunk of 25. *pygmaeus*; 26. *intrudens* (small worker); 27. *wissmanni*.



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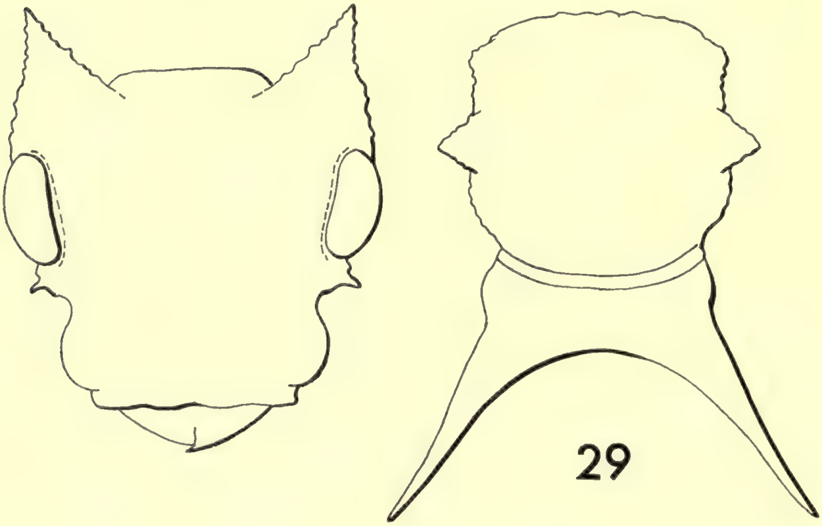

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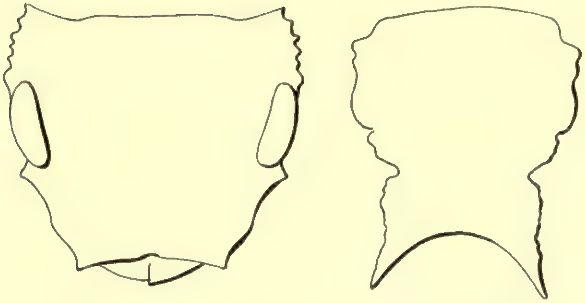
FIGS 28, 29. Outline of head and dorsal alitrunk of 28. *latissimus*; 29. *insularis*.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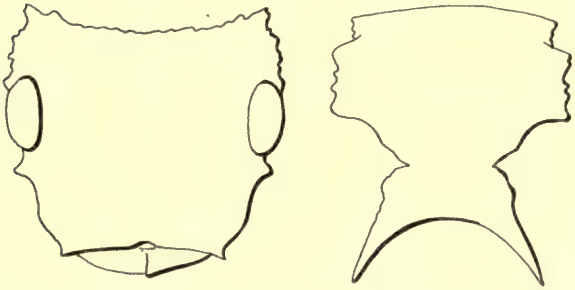
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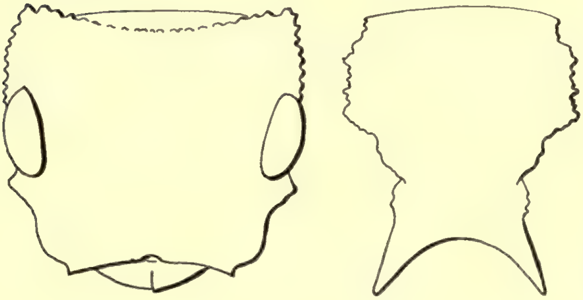
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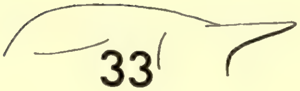
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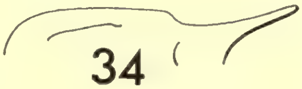
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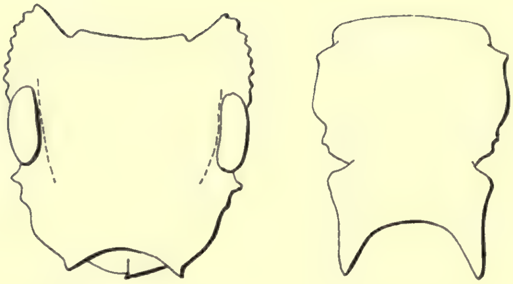
FIGS 30–32. Outline of head and dorsal alitrunk of 30. *chapmani* sp. n. holotype worker; 31. *flagitiosus*; 32. *taprobanae*.

FIGS 33, 34. Profile of alitrunk to show dorsal outline in workers of 33. *taprobanae*; 34. *flagitiosus*.



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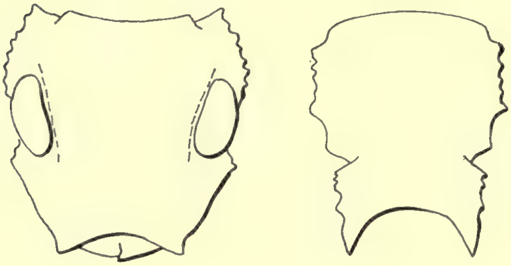

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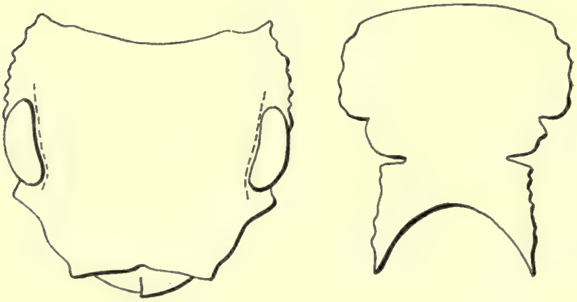

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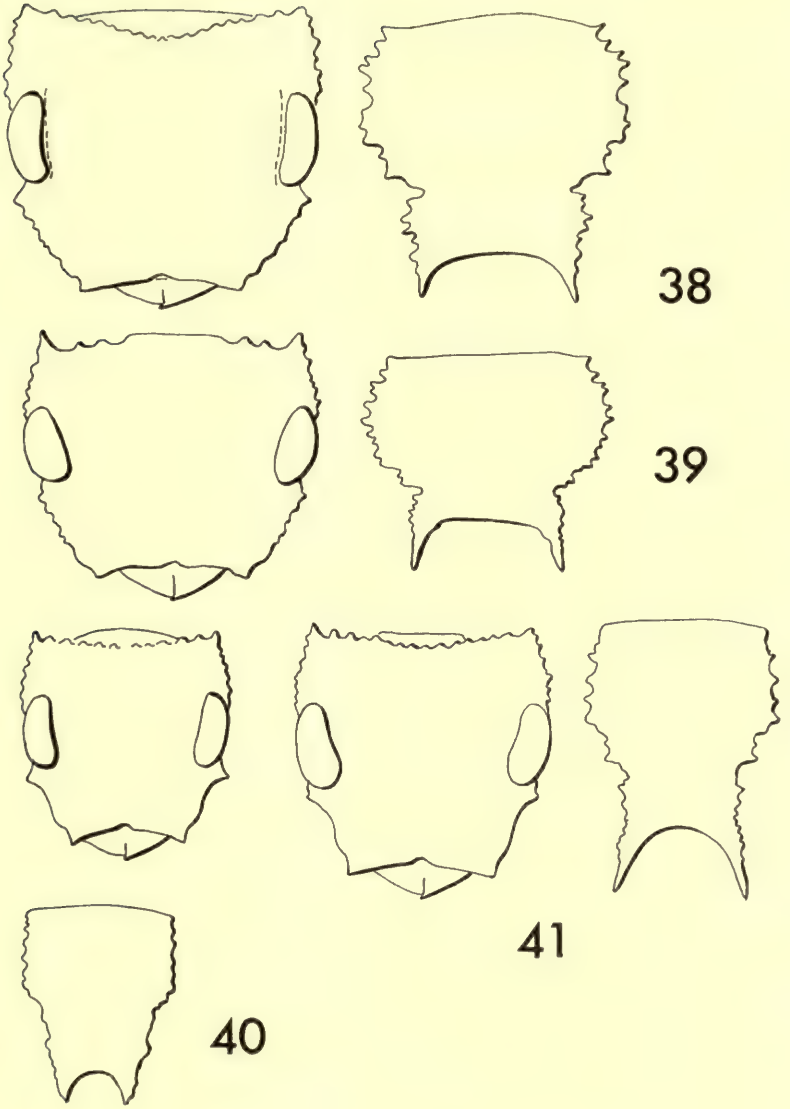
Figs 35–37. Outline of head and dorsal alitrunk of 35. *reticulatus*; 36. *praetextus*; 37. *catuvolcus* sp. n., holotype worker.



FIGS 38–41. Outline of head and dorsal alitrunk of 38. *marginatus* sp. n., holotype worker; 39. *hispidulus*; 40. *simoni*; 41. *nenassus* sp. n.; holotype worker.

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A REVISION OF SOME GROUPS OF *LIPTENA* WESTWOOD (LEPIDOPTERA : LYCAENIDAE)

H. STEMPFFER, N. H. BENNETT
AND
S. J. MAY

BULLETIN OF
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ENTOMOLOGY Vol. 30 No. 2
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A REVISION OF SOME GROUPS OF *LIPTENA* WESTWOOD (LEPIDOPTERA : LYCAENIDAE)

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Pp. 107–181; 6 *Plates*, 49 *Text-figures*

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SYNOPSIS

The white and yellow 'groups' of *Liptena* Westwood are revised and a key to the species and subspecies is provided. Seven new species and ten new subspecies are described. Four lectotypes and one neotype are designated, and the status of four taxa is altered.

INTRODUCTION

In 1963 the two senior authors erected the genus *Falcuna* for a number of species of *Liptena* Westwood which are characterized by a unique feature in the male genital armature, namely the fusion of the paired subunci along their median margins. Another group, the *Tetrarhanis*, has been separated by Karsch (1893 : 217).

Of the remaining species of *Liptena*, almost a hundred at present known, the male genitalia can be generally described as follows: the uncus more or less crescentic, the paired subunci free, the tegumen weakly sclerotized, the valvae rectangular with the two processes widely separated in their distal part, the vinculum often terminating ventrally in a long, spatulate saccus, which, contrary to the usual structural habit, is turned upward and outward, lying parallel to the ventral margins of the valvae; in some species the intervening space is filled with a mass of transparent, globular scales. These scales have been loosely termed coremata by the authors, but this usage is not in strict accordance with the definition given by Tuxen (1970). The function of these scales is a matter for conjecture, scent distribution being the most obvious answer. They are only feebly attached to the saccus, and frequently disappear during the normal dissecting processes.

Among the species of *Liptena* not treated in this paper, only the *tullia*-group and the *ideoides*-group exhibit genitalia of a type sufficiently different to merit separation from this genus: the genital structures differ markedly from those of the type-species *undularis* Hewitson (see Stempffer, 1967 : 48–53).

The most practical way of dealing with this mass of species is to group them according to their upperside ground colour. This yields four divisions: a white 'group', a yellow 'group', an orange 'group', and a black 'group'. This method is, we freely admit, quite unscientific, but gives a convenient basis for study. The present work deals only with the white and yellow colour-groups.

There is a great deal of similarity in facies within the 'groups' and so many published figures do little or nothing to aid separation. This has led to the need for numerous dissections – often as many as 10–15 have been made of a single form. The study has been a protracted one lasting several years.

Even though limited to two colour-groups only, the work is very long. It is hoped to complete the study of the remaining groups in time. A great problem remains in the determination of the species described by Schultze, all the types of which were lost, and descriptions sometimes poor.

Unless otherwise stated all material examined is either in the collection of the British Museum (Natural History), usually abbreviated to BMNH, or in that of Monsieur Stempffer. Other depositories are abbreviated as follows:

CM	Carnegie Museum, Pittsburgh
MNHN	Muséum National d'Histoire Naturelle, Paris
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin
MRAC	Musée Royal de l'Afrique Centrale, Tervuren
UM	University Museum, Oxford
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich

Of the species treated here the great majority are found in western Africa only; a small number range through the Congo Basin to Uganda and Kenya in the east. Two species, *homeyeri* Dewitz and *undularis* Hewitson, are found in the south, while the most northerly extent of the range of the genus is the Sudan (*ferrymani* (Grose-Smith & Kirby)). The authors wish to emphasize that the localities given for each form are only those known to us at the present time, and may not be limiting.

ACKNOWLEDGEMENTS

Our gratitude is here expressed to those individuals and institutions who have contributed material, loaned type-specimens, and supplied information to facilitate this work. Especially we wish to acknowledge our great debt to the late T. H. E. Jackson of Kitale, Kenya, who supplied so much of the material used in this work. Our thanks are also due to Mr T. B. Larsen, to Dr H. J. Hannemann of the Museum für Naturkunde, Berlin, to Dr B. Herting of the Staatliches Museum für Naturkunde, Stuttgart, to Dr K. W. Harde of the Staatliches Museum für Naturkunde, Ludwigsburg, to Dr W. Forster of the Zoologische Staatssammlung, Munich, to Dr J. Moucha of the National Museum of Czechoslovakia, to Mr L. A. Berger at Tervuren, to Mr M. P. Clifton of the Coryndon Museum, Nairobi, to Dr G. Bernardi, Muséum National d'Histoire Naturelle, Paris, and to the authorities of the Carnegie Museum, Pittsburgh. We also wish to thank Mr D. K. Read of the Tring Museum for the translation of original descriptions.

LIPTENA Westwood

Liptena Westwood, [1851] : pl. 77. Type-species: *Liptena undularis* Hewitson, [1866], by subsequent designation, 1959, *in Opin. Decl. int. Commn zool. Nom.* **20** : 377–390 (Opinion 566).
Parapontia Röber, 1892 : 280. Type-species: *Liptena undularis* Hewitson, [1866], by monotypy.
Leucolepis Karsch, 1893 : 216. Type-species: *Teriomima decipiens* Kirby, 1890, by subsequent designation by Hemming, 1964 : 133.
[*Pseudoliptena* Stempffer, 1946 : 8. Type-species: *Pseudoliptena bitje* Stempffer, 1946, by original designation. Type-species based on a composite holotype (see Hemming, 1963 : 292).]

Eyes smooth, palpi reaching well beyond frons, second joint long and laterally compressed, bearing adpressed scales, third joint rather long, acuminate; antennae of moderate length, white-ringed and with a gradually swollen club flattened apically; fore tarsi of ♂ not segmented, delicately spinose beneath.

Wing venation is not uniform throughout the genus. In *undularis* Hewitson, vein 7 on the forewing ends on the outer margin slightly below the apex, veins 3 and 4 on the hindwing arise from a short common stalk. This is the position in a number of species, e.g. *xanthostola* (Holland), *evanescens* (Kirby), *flavicans* (Grose-Smith & Kirby), *rochei* Stempffer, *undina* (Grose-Smith & Kirby), *fulvicans* Hawker-Smith, *eukrines* Druce, *homeyeri* Dewitz, *despecta* (Holland), *modesta* (Kirby), etc. In *Liptena decipiens* (Kirby) vein 7 on the forewing similarly ends below the apex, but veins 3 and 4 on the hindwing arise from a common point at the lower angle of the cell, which is the condition also in *alluaudi* Mabille, *tulliana* Smith, *tullia* (Staudinger), *o-rubrum* (Holland), *rubromacula* Hawker-Smith, etc. The venation of *albomacula* Hawker-Smith, *ideoides* Dewitz, and *gordoni* (Druce) is identical with that of *Falcuna* Stempffer & Bennett. In *fatima* (Kirby) and *submacula* Lathy, vein 7 of the forewing terminates at the apex.

The systematic divisions which could be established on slight difference in venation do not correspond with those based on characters of the male genitalia, nor with the divisions based on ground colour. Not all the species of *Liptena* conform to a uniform pattern of male genitalia; roughly there are three patterns. The species dealt with in this paper are included in pattern A (see Stempffer, 1967 : 49).

Key to the Species and Subspecies

1		Upperside ground colour white or cream	2
–		Upperside ground colour yellow or orange	39
2	(1)	Hindwing upperside with dark outer marginal band	3
–		Hindwing upperside without dark outer marginal band	18
3	(2)	Ground colour white	4
–		Ground colour cream	17
4	(3)	Forewing upperside with costal band slightly narrower than outer marginal band. Hindwing outer marginal band slightly narrower than that of forewing. (From Nigeria and Cameroun.) ♂ genitalia (Text-fig. 2): uncus trapezoidal with a broad depression in the distal margin; subunci (Text-fig. 1a) broadened gradually towards their	

triangular termination; saccus short and pointed; dorsal process of the valva with a blunt, hooked projection and an excision between this and the slender apex . . . . ***opaca opaca*** (p. 118)

– Characters not as above 5

5 (4) Forewing upperside with costal band covering almost the entire discoidal cell. Outer marginal bands on fore- and hindwing equal in width to costal band of forewing. (From Gabon.)

♂ genitalia (Text-fig. 1b): subunci slender and triangular ***opaca gabunica*** (p. 119)

– Characters not as above 6

6 (5) Forewing upperside with costal band narrower than outer marginal band. Hindwing outer marginal band of same width as forewing costal band. (From Cameroun and Congo (Brazzaville.)

♂ genitalia: subunci (Text-fig. 1c) much dilated towards the tip, and bearing a hook on the upper margin; valva with the ventral process narrow . . . . ***opaca centralis*** (p. 120)

– Characters not as above 7

7 (6) Forewing upperside with costal and outer marginal bands of approximately equal width; outer marginal band tapering towards tornus. Hindwing outer marginal band narrower than that of forewing. Forewing underside with apex bearing large patch of white ground colour. (From Uganda.)

♂ genitalia: subunci (Text-fig. 1d) narrow at base, dilated centrally, then tapering to a sharp point . . . . . . ***opaca ugandana*** (p. 120)

– Characters not as above 8

8 (7) Forewing upperside with outer marginal band broader than costal band. Hindwing outer marginal band of similar width to costal band of forewing. (From Cameroun and Zaire.)

♂ genitalia (Text-fig. 3): subunci slender, angled, and sharply pointed; ventral process of valva longer than the dorsal . ***opaca sankuru*** (p. 121)

– Characters not as above 9

9 (8) Forewing upperside with outer marginal band broader than costal band, and tapering towards tornus. Hindwing outer marginal band of similar width to forewing costal band. (From Cameroun, Zaire and Uganda.)

♂ genitalia (Text-fig. 4): uncus with a weakly-convex distal margin; subunci angled, and dilated centrally; ventral process of valva long and fine, dorsal process without a hooked projection . . . . ***albomacula*** (p. 123)

– Characters not as above 10

10 (9) Forewing upperside with costal band invading upper part of discoidal cell; outer marginal band a little broader than the costal. No discoidal markings on upperside. Length of forewing 15 mm. (From Nigeria.)

♂ genitalia (Text-fig. 10): uncus bifid, the two parts separated by a deep, rounded depression; subunci long, curved, and slender.

submacula submacula (p. 128)

– Characters not as above 11

11 (10) Forewing upperside with costal band covering almost the entire discoidal cell. Discoidal marks present on upperside of all wings. Hindwing underside with discoidal spot of moderate size. Length of forewing 15 mm. (From Ivory Coast and Ghana.)

♂ genitalia (Text-fig. 11): subunci in the form of a shallow, horizontal letter 'Y' . . . . ***submacula tringa*** (p. 130)

– Characters not as above 12

12 (11) Forewing upperside with outer marginal band broad, 4 mm at tornus. Length of forewing 17 mm. (Known from Ghana only.)

♂ genitalia (Text-fig. 12): subunci strongly curved, and dilated centrally

submacula maesseni (p. 131)

– Characters not as above 13

13 (12) Forewing upperside with costal band obscuring base of the discoidal cell, outer marginal band of approximately the same width. Hindwing underside with large discoidal spot. Length of forewing 14·5 mm. (From Sierra Leone and Liberia.)

♂ genitalia (Text-fig. 13): subunci curved, in the shape of a cobbler's last **submacula liberiana** (p. 132)

– Characters not as above 14

14 (13) Forewing upperside with costal band entirely covering the discoidal cell, outer marginal band very broad, but narrower than costal band, leaving only a small, white inner marginal area. Hindwing upperside outer marginal band less than half the width of that of forewing. Hindwing underside with several small, well-defined black spots in basal area . . **perobscura** (p. 159)

– Characters not as above 15

15 (14) Forewing upperside with costal band covering almost the entire discoidal cell; outer marginal band approximately equal in width to the costal. Hindwing outer marginal band a little more than half the width of that of forewing. Discoidal marks on all wings large, quadrate and rather smudgy. (Known only from Ivory Coast.)

♂ genitalia (Text-fig. 6): uncus with a blunt median point; valvae triangular, with the two processes widely separated distally, the dorsal one terminating in a sharp point; aedeagus curved. . . **griveaudi** (p. 124)

– Characters not as above 16

16 (15) Forewing upperside with costal band covering approximately half the discoidal cell; outer marginal band of uniform width, and broader than the costal. Hindwing outer marginal band a little narrower than that of forewing. Antennal club orange. (From Ivory Coast, Nigeria and Cameroun.)

♂ genitalia (Text-fig. 5): uncus with distal margin weakly concave; subunci long and tapering; valvae rectangular, with dorsal process excised at tip; aedeagus strongly curved . . . . . . **titei** (p. 124)

– Forewing upperside with costal band covering almost the entire discoidal cell; outer marginal band of approximately the same width as costal. Hindwing outer marginal band of similar width to that of forewing. A discoidal spot present on all wings. (From Cameroun.)

♂ genitalia (Text-fig. 7): uncus elongate and conical, with a rounded excision at apex; subunci shaped like a cobbler's last; aedeagus long, gently curved, with a small dorsal tooth and a large, blunt, ventral projection **confusa** (p. 125)

17 (3) Hindwing underside with discoidal spot of moderate size. Length of forewing 14 mm. (From Cameroun and Congo (Brazzaville).)

♂ genitalia (Text-figs 8, 9b): subunci in the shape of a horizontal letter 'Y', the lower arm of the 'Y' more slender than the upper; aedeagus longer than valva, slender centrally, and dilated at the tip . **ouesso ouesso** (p. 126)

– Hindwing underside with a large discoidal spot. Length of forewing 16 mm. (From Congo (Brazzaville).)

♂ genitalia (Text-fig 9a): subunci dilated centrally **ouesso mayombe** (p. 128)

18 (2) Hindwing underside marked by 5 or more transverse lines 19

– Characters not as above 21

19 (18) Forewing upperside with a brown arc arising from base of costa; apical patch extending down outer margin to vein 2 . . . . **ferrymani** (p. 152)

– Characters not as above 20

20 (19) Forewing upperside unmarked except for the dark apical patch, which is angled, extending down outer margin almost to vein 4. Length of forewing 20 mm **undularis** (p. 150)

– Forewing upperside with costa broadly brown throughout; apical patch terminating in a fine line between veins 3 and 2 on outer margin. Length of forewing 16 mm . . . **septistrigata** (p. 154)

21 (18) Hindwing underside marked by one or more spots . . . 22

– Characters not as above . . . 26

22 (21) Forewing upperside with the broad, blackish-brown costal band invading the discoidal cell. Upperside ground colour white. Hindwing underside with a large, rectangular, subcostal spot in cell space 6 . **nigromarginata** (p. 157)

– Characters not as above . . . 23

23 (22) Forewing upperside with costa black throughout; apical patch small and angled, extending down outer margin to vein 4. Upperside ground colour creamy white. Hindwing underside with three of the spots of approximately equal size: one in the discoidal cell, and two subcostal. **inframacula** (p. 149)

– Characters not as above . . . 24

24 (23) Forewing upperside with costa brown throughout. Hindwing underside bearing a well-defined discoidal spot . . . **subsuffusa** (p. 158)

– Characters not as above . . . 25

25 (24) Forewing upperside with proximal half of costa cream; base of wing tinged with orange. Underside of all wings bearing a discoidal spot . **fatima** (p. 133)

– Forewing upperside with proximal half of costa dull white, extreme base of costa fuscous. Underside of all wings with a discoidal line; hindwing with a brown spot within the discoidal cell . . . **bassae** (p. 142)

26 (21) Hindwing underside without dark markings. Upperside ground colour cream. Legs black . . . 27

– Characters not as above . . . 31

27 (26) Forewing upperside with costa broadly brown throughout. Hindwing underside without yellow marginal lines. (From Uganda.)
♂ genitalia (Text-fig. 23): subunci with a long apophysis; valva with a short ventral process; aedeagus curved, with an acute extremity **hapale** (p. 144)

– Characters not as above . . . 28

28 (27) Forewing upperside with an evenly curved inner edge to the dark apical patch. (Known only from Ghana and Nigeria.)
♂ genitalia (Text-fig. 28): uncus triangular; subunci long, of medium breadth, and with a tapered base . . . **pearmani** (p. 148)

– Characters not as above . . . 29

29 (28) Forewing upperside with large apical patch. (From Congo (Brazzaville).)
♂ genitalia (Text-fig. 27): subunci short and broad; apex of valva long, narrow, and whip-like . . . **decipiens etoumbi** (p. 148)

– Characters not as above . . . 30

30 (29) Forewing upperside with apical patch of moderate size. (From Nigeria and north Cameroun.)
♂ genitalia (Text-fig. 25): uncus trapezoidal; subunci slender and of uniform width; apex of valva broadly triangular **decipiens decipiens** (p. 145)

– Forewing upperside with apical patch of moderate size. (From south Cameroun and Gabon.)
♂ genitalia (Text-fig. 26): subunci broad; apex of valva broadly triangular **decipiens leucostola** (p. 146)

31 (26) Hindwing underside without dark markings. Upperside ground colour white. Legs yellow and fuscous . . . 32

– Hindwing underside with dark outer marginal band . . . 38

32 (31) Costa distinctly brown throughout . . . 33

– Costa only partially brown, or white in parts . . . 36

33 (32) Forewing upperside with costa broadly blackish brown throughout, apical

patch extending down outer margin to vein 4. Upperside ground colour white. Length of forewing 16·5 mm. (From Ivory Coast.)

♂ genitalia (Text-fig. 22): uncus long; subunci weakly curved, with a swollen tip; valvae rectangular, with the dorsal process folded across the broad ventral process; aedeagus small and slender, dilated before the pointed tip . . . . **tiassale** (p. 143)

– Characters not as above 34

34 (33) Forewing upperside with costa broadly brown throughout, apical patch extending down outer margin to vein 3. Upperside ground colour dirty white. Length of forewing 15 mm. (From Cameroun, Fernando Po and Gabon.)

♂ genitalia (Text-fig. 33): uncus with two triangular lobes, separated by a deep concavity; subunci curved, swollen centrally, the distal extremity anvil-shaped; valvae with the dorsal process ending in a broad hook, the ventral process rounded distally; aedeagus long and stout, with the distal third dilated . . . . **subundularis** (p. 156)

– Characters not as above 35

35 (34) Forewing upperside with costa blackish brown throughout, the apical patch extending down outer margin to vein 2, and having an evenly curved inner edge. Ground colour of both surfaces pure white, no yellowish tinge. Forewing underside usually with one or more irregular fuscous bands in apical area. Length of forewing 14·5 mm. (From Ivory Coast, Nigeria, Cameroun and Uganda.)

♂ genitalia (Text-fig. 18): uncus with distal margin deeply concave; subunci strongly curved, dilated centrally; dorsal process of valva long and vermiform, ventral process broad and rounded . . **augusta** (p. 138)

– Forewing upperside with costa blackish brown throughout, apical patch terminating abruptly at vein 4 on outer margin. Upperside ground colour pure white. Length of forewing 14 mm. (From Cameroun and Congo (Brazzaville).)

♂ genitalia (Text-fig. 19): uncus with distal margin regularly rounded, slightly depressed in the middle; valva with dorsal process short and moderately broad, ventral process terminating obliquely . . **ilaro** (p. 139)

36 (32) Forewing upperside with costa brown at base, dusted with brown medially; apical patch small, terminating at vein 4 on outer margin. Upperside ground colour white. Length of forewing 14 mm. (Known only from Cameroun, Congo (Brazzaville) and Uganda.)

♂ genitalia (Text-fig. 17): uncus widely excised at distal margin; subunci slender and straight; saccus shaped like a fish-tail; valva with a short dorsal process; aedeagus straight . . . . **batesana** (p. 137)

– Characters not as above 37

37 (36) Forewing upperside with costa white, except in apical region, brown at base; apical marking of moderate size, 3 mm in width at vein 6. Forewing underside with costa and outer margin tinged with bright yellow. Length of forewing 14 mm. (From Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana and Nigeria.)

♂ genitalia: subunci slightly swollen centrally . . **albicans** (p. 134)

– Forewing upperside with costa white, except at apex; apical marking slight, only 1·5–2·0 mm in breadth at vein 6. Forewing underside tinged with yellow at base of costa. Length of forewing 15 mm. (From Ivory Coast and Nigeria)

♂ genitalia (Text-fig. 16): subunci long, sinuate and very slender **alluaudi** (p. 135)

38 (31) Forewing upperside with costa broadly blackish brown throughout; apical patch large, terminating between veins 3 and 2 on outer margin. Hindwing

underside with dark outer marginal band of 3 mm width. (From Guinea, Sierra Leone, Liberia, Ghana and Nigeria.) . ***simplicia simplicia*** (p. 140)

– Forewing upperside with costa brown at base, apical patch small, terminating between veins 4 and 3 on outer margin. Hindwing underside with dark outer marginal band of 1·5 mm width. (From Ivory Coast.) ***simplicia*** f. ***semilimbata*** (p. 142)

39 (1) Hindwing underside with bold spots 58

– Characters not as above 40

40 (39) Hindwing underside with irregular barred markings 51

– Characters not as above 41

41 (40) Underside bearing orange, ochreous or tawny linear markings . . . 49

– Underside hindwing with no dark markings, or with yellow markings . . 42

42 (41) Forewing upperside with apical marking small to non-existent. Ground colour weak yellow to yellowish cream. Length of forewing 25·5–29·0 mm.

♂ genitalia (Text-fig. 37): subunci short and straight, dilated distally, with a short hook at the tip; aedeagus short and robust, dilated towards the rounded distal extremity, and furnished with a large, strong tooth on the ventral surface . . . . . . ***evanescens evanescens*** (p. 160)

– Characters not as above 43

43 (42) Forewing upperside with apical patch usually present, but not reaching outer margin; base of costa brown. Upperside ground colour yellow. Length of forewing 23·5–27·5 mm . . . . . ***evanescens xanthis*** (p. 161)

– Characters not as above 44

44 (43) Forewing upperside apical marking of moderate size, with its inner border evenly curved, not angled. Ground colour deep, rich yellow. Underside ground colour uniform, not paler at inner margin of forewing; hindwing without yellow submarginal lines.

♂ genitalia (Text-fig. 39): subunci robust and anvil-shaped; aedeagus short and stout, with a small tooth on the ventral surface, and an obliquely cut tip . . . . ***bolivari*** (p. 163)

– Characters not as above 45

45 (44) Forewing upperside with dark costal band up to 1 mm in width; apical patch with evenly curved inner edge extending almost to tornus. Palpi blackish brown. Length of forewing 13 mm. (From Rio Muni and Gabon.)

♂ genitalia: subunci short and straight, dilated distally, bearing a short hook at tip; aedeagus small, the distal third angled and having a blunt tip ***xanthostola xanthostola*** (p. 165)

– Characters not as above 46

46 (45) Forewing upperside apical patch extending in an even curve from mid-costa to vein 3 on outer margin. Palpi yellow at base with tips blackish brown. Length of forewing 14·0–14·5 mm. (From Sierra Leone, Ivory Coast and Ghana.)

♂ genitalia as in *x. xanthostola* . . ***xanthostola coomassiensis*** (p. 166)

– Characters not as above 47

47 (46) Forewing upperside with proximal half of costa dusted with dark scales; apical patch covering approximately one-third of wing and terminating at vein 2 on outer margin – its inner border may be evenly curved, irregular, or angled. Hindwing underside with double yellow submarginal lines. Palpi blackish brown. Length of forewing 15–17 mm. (From Zaire, Uganda, Kenya and Sudan.)

♂ genitalia as in *x. xanthostola* . . . ***xanthostola xantha*** (p. 166)

– Characters not as above, forewing upperside with large apical patch . . 48

48 (47) Forewing upperside with dark costal band not invading discoidal cell. Ground colour pale primrose. Hindwing underside without yellow submarginal lines. Length of forewing: 16·5 mm.
♂ genitalia (Text-fig. 42): subunci moderately long, bearing a point at the tip; aedeagus large, the basal half greatly enlarged with its extremity squarely cut, the distal half cylindrical . . . . . ***overlaeti*** (p. 169)

– Forewing upperside with dark costal band invading discoidal cell. Ground colour sulphur yellow. Hindwing underside without yellow submarginal lines. Length of forewing: 12·5 mm.
♂ genitalia (Text-fig. 43): subunci stout, anvil-shaped; aedeagus boomerang-shaped, swollen centrally and with an acute tip . . . ***fontainei*** (p. 169)

49 (41) Forewing upperside with reduced apical patch and no costal band
evanescens (*immaculata* sensu Aurivillius) (p. 160)

– Characters not as above 50

50 (49) Underside entirely orange-yellow, including forewing apical region, and marked by orange transverse lines situated mainly on the proximal half of the wings; discoidal line present on all wings . . . . ***ochrea*** (p. 162)

– Underside with forewing yellow, apical region cream; hindwing cream, marked by narrow ochreous, transverse bars, but without discoidal line
undina (p.164)

51 (40) Forewing upperside with a broad, dark costal band encroaching on upper limit of discoidal cell. Ground colour tawny-orange. Hindwing underside markings blurred 57

– Forewing upperside with costa brown, or brown and yellow. Ground colour yellow or orange. Hindwing underside markings distinct 52

52 (51) Hindwing underside with barring purplish wine. Upperside ground colour yellowish orange. (Known only from Zaire.) ***flavicans aequatorialis*** (p. 176)

– Hindwing underside with barring fuscous 53

53 (52) Hindwing underside ground colour very pale – almost white. Upperside ground colour yellow; forewing with apical patch of moderate size. (From Uganda.) . . . . ***flavicans katera*** (p. 176)

– Characters not as above 54

54 (53) Hindwing underside showing regular brown bars of uniform width, no fusion of yellow ground colour in central area of wing (Text-fig. 47a). Ground colour on both surfaces deep glowing orange. Forewing upperside with large apical patch. (From south Cameroun and Congo Basin.)
flavicans praeusta (p. 175)

– Characters not as above 55

55 (54) Hindwing underside with a dark median band enlarged into a blotch on the discoidal vein, and the next band distad widened to form a rectangular costal blotch (in cell spaces 7 and 6). Length of forewing 15–17 mm.
♂ genitalia (Text-fig. 45): subunci with their distal third divided into two processes . . . . ***rochei*** (p. 172)

– Characters not as above 56

56 (55) Hindwing underside showing a slight fusion of yellow ground colour, due to a break in one of the brown bars (Text-fig. 47c). Forewing upperside with costa brown throughout. (From west and south Cameroun.)
flavicans flavicans (p. 173)

– Hindwing underside with fusion of yellow ground colour in the upper median area, due to break in two of the brown bars (Text-fig. 47b). Forewing upperside with proximal half of costa yellow. (From Ivory Coast, Nigeria and west Cameroun.) . . . . ***flavicans oniens*** (p. 174)

57 (51) ♂ genitalia: distal border of the uncus with a deep concavity separating two projections; subunci slender, tapering to a point . . . ***durbania*** (p. 176)

– ♂ genitalia: uncus widely excised at the distal margin; subunci slender and straight, hooked at tip . . . . **bergeri** (p. 177)
58 (39) Hindwing underside with two black spots near costa. (From Zaire, south-east Angola, Rhodesia and Tanzania) . . . . **homeyeri homeyeri** (p. 170)
– Hindwing underside with only one black spot situated midway along the costa. (From north and central Angola) . . . . **homeyeri straminea** (p. 171)

Descriptions of Species and Subspecies

Liptena opaca (Kirby)

Larinopoda opaca Kirby, 1890 : 266.

This species is distributed through Nigeria, Cameroun, Gabon, Congo (Brazzaville), Zaire and Uganda. Other species of *Liptena* found within the limit of its range and with which *opaca* may be confused are: *submacula*, *titei*, and *albomacula*. *L. submacula* (from Nigeria) does not possess discoidal markings on its upper surface and also differs from *opaca* in the relative widths of the dark bands on the upperside. *L. titei* also differs from *opaca* by the relative widths of these dark bands and in the colour of the antennal club (see key, nos. 4, 16). *L. albomacula* is more difficult to separate; the forewing outer marginal band is tapered towards the tornus and there is no discoidal marking on the hindwing upperside, but the most definite characters for separation are provided by the male genitalia, where numerous small differences can be found; however, the most positive difference is shown by the dorsal process of the valva which does not possess a blunt, hooked projection like that of *opaca*.

Liptena opaca opaca (Kirby)

(Pl. 1, figs 1, 4; Text-figs 1a, 2)

Larinopoda opaca Kirby, 1890 : 266. LECTOTYPE ♂, CAMEROUN (*Preuss*) (BMNH), here designated [examined].
Larinopoda opaca Kirby; Grose-Smith & Kirby, 1892*a* : pl. 16, figs 3, 4.
Liptena opaca var. *immaculata* Grunberg, 1910 : 477. 2 syntypes, sex unknown, EQUATORIAL GUINEA: Rio Muni, Alcu, 15.vi.1906 and 26.ix.1906 (depository unknown).

The original series of this species was destroyed in the last world war, with the exception of one male specimen which is in the BMNH collection. It bears a label 'Kamerun int. Pr.', also a faded mauve label 'Origin.' of the kind used by Staudinger on his syntypes. The example agrees with the original description and is here designated as lectotype.

The nominate subspecies is recorded from Nigeria and Cameroun.

♂. *Upperside*. Ground colour pale cream-white. Forewing with the costa broadly brown throughout its length, this coloration extending as an even broader band, 4 mm in width, down the outer margin. It continues as a slightly narrower band along the outer margin of the hindwing; a large, oval, brown discoidal spot is the only other marking on the hindwing upperside.

Underside. Similar to the upperside except that the costal band of the forewing is less well-defined, and that the outer marginal band is not quite as broad, neither does it reach the tornus. There is no light patch at the apex of the forewing underside.

Length of forewing: 15 mm. Legs orange, the tarsi ringed with dark brown; palpi with dark brown and orange scaling; antennae dark brown ringed with white, the club tipped with orange.

♂ *genitalia.* Tegumen rectangular surmounted by a trapezoidal uncus with a broad depression at the distal margin. Subunci broadened gradually towards their termination which is approximately in the form of an isosceles triangle. Vinculum narrow with a short, pointed saccus. Valvae rectangular, the two processes widely separated in the distal part; the dorsal process exhibits a blunt, hooked projection with an excision between this and the slender apex; the ventral process is moderately broad, curved, with a rounded apex. Aedeagus long and straight, enlarged at the tip.

♀. The females of *opaca* are not so heavily marked as the males, the outer marginal bands are narrower and the discoidal spot on the hindwing upperside is reduced to a few brown scales, or absent entirely.

MATERIAL EXAMINED.

Lectotype ♂, CAMEROUN: 'Kamerun int. Pr.', dissection no. NHB. 1956–2155, B.M. Type No. Rhop. 17252.

NIGERIA: 1 ♀, Ndebizi, Calabar Prov., –.ii.1958 (*T. H. E. Jackson*); 1 ♀, Uwet, –.x.1920, Cator coll.; 1 ♀, Akpabuyo, southern Nigeria, –.i.1921, Cator coll.; 1 ♀, Obudu, Ogoja Prov., –.v.1961 (*T. H. E. Jackson*).

Liptena opaca gabunica **subsp. n.**

(Pl. 1, figs 2, 5; Text-fig. 1b)

Recorded from Gabon only.

♂. *Upperside.* Ground colour less creamy than in *o. opaca*, otherwise similar except that the costal band is slightly broader, obscuring the greater part of the cell. The costal and outer marginal bands are of approximately equal width.

Underside. Similar to that of *o. opaca*, ground colour slightly whiter. On the forewing the brown costal band is of uniform width from base to apex, but not curving across the apex to meet the outer marginal band as in *o. opaca*; the outer marginal band is also narrower. On the hindwing the discoidal spot is much smaller. The specimens of *gabunica* in the BMNH tend to be of smaller size than the nominate race.

Length of forewing: 15 mm. Legs orange; palpi and antennae as in *o. opaca*.

♂ *genitalia.* Differs from *o. opaca* in the subunci, which are more slender.

♀. Markings and size as in the ♂.

MATERIAL EXAMINED.

Holotype ♂, GABON: '*opaca* Kirby Gabon', ex Oberthür coll., dissection no. NHB. 1959–2173, B.M. Type No. Rhop. 17253.

Paratypes. GABON: allotype ♀, Ogowe, Godman & Salvin coll., B.M. Type No. Rhop. 17254; 1 ♂, as holotype, dissection no. NHB. 1959–2170; 1 ♂, Ogowe, ex Grose-Smith coll., dissection no. NHB. 1959–2180; 1 ♀, Godman & Salvin coll.; 1 ♀, Kuilu, 1892 (*Mocquerys*); 1 ♂, (this specimen in Stempffer coll.); 1 ♂, Lake

Asebbe, Fernan-Vaz, –.i.1908 (*Dr Ansorge*), dissection no. NHB. 1959–2172; 1 ♀, Lake Asebbe, Fernan-Vaz, –.i.1908 (*Dr Ansorge*); 1 ♀ Fernan-Vaz (this specimen in Stempffer coll.).

***Liptena opaca centralis* subsp. n.**

(Pl. 1, figs 3, 6; Text-fig. 1c)

Recorded from Cameroun and Congo (Brazzaville).

♂. *Upperside.* Ground colour white. Forewing with the brown costal border broader than in *o. opaca*, the small discoidal streak is confluent with the costal border. The outer marginal band is much broader than in *o. opaca*, measuring 4 mm, and curving inwards to meet the costal band. On the hindwing the discoidal spot of the underside is visible through the wing, just a few brown scales forming the faint discoidal line on the upperside.

Underside. Ground colour of a purer white than the upperside. At the apex of the forewing the white ground colour breaks through the brown costal band. This light patch is larger in examples from Congo (Brazzaville). There is a small, faint, discoidal streak on the forewing and a well-defined discoidal spot on the hindwing.

Length of forewing : 14 mm. Palpi black; legs and antennae as in typical *opaca*.

♂ *genitalia.* The subunci differ from those of *o. opaca* (see Text-figs), also the ventral process of the valva is much narrower in this form.

♀. Markings and size as in the ♂.

MATERIAL EXAMINED.

Holotype ♂, CONGO (BRAZZAVILLE): 'Etoumbi, Moyen Congo, Fr. Equat. Afr., Mar. 1959, T. H. E. Jackson', dissection no. NHB. 1967–2664, B.M. Type No. Rhop. 17255.

Paratypes. CONGO (BRAZZAVILLE): allotype ♀, Etoumbi, –.xi.1958 (*T. H. E. Jackson*), B.M. Type No. Rhop. 17256; 2 ♂, as holotype, –.i.1959; 2 ♂, as holotype, –.xi.1958; 1 ♀, Etoumbi, –.iii.1959 (*T. H. E. Jackson*); 1 ♀, Etoumbi (this specimen in Stempffer coll.); 1 ♀, Mambili Forest, Ouesso, –.vi.1959 (*T. H. E. Jackson*); 1 ♀, Kelle, –.ii.1963 (*T. H. E. Jackson*). CAMEROUN: 2 ♂, Bitje, wet season, 1913; 2 ♀, Bitje, Ja River, 2000 ft, dry season (*G. L. Bates*); 1 ♂, Bitje, Ja River, 2000 ft, –.ix-x-xi. 1911; 1 ♂, Bitje, Ja River, 2000 ft (*G. L. Bates*); 1 ♀, Bitje (this specimen in Stempffer coll.).

***Liptena opaca ugandana* subsp. n.**

(Pl. 1, figs 7, 10; Text-fig. 1d)

Recorded from Uganda only.

♂. *Upperside.* Ground colour brilliant white. On the forewing the costal band is of approximately the same width as the outer marginal band. The discoidal mark of the forewing is not pronounced. Hindwing with the outer marginal band narrower than in the other subspecies. The large discoidal spot of the underside is visible through the wing.

Underside. Forewing with a circular patch of the white ground colour within the brown apical area. The costal band is slightly broader than in typical *opaca*, and a small discoidal mark is present. The discoidal spot of the hindwing is deep brown, oval and large. Other dark markings as in *o. opaca*.

Length of forewing : 16 mm. Palpi black; legs and antennae as in typical *opaca*.

♂ *genitalia*. The subunci differ from those of the other subspecies: they are narrow at the base, broadening midway where they are approximately four times the width of the base, and then tapering off evenly to a sharp point.

♀. Markings as in ♂. Length of forewing : 15 mm.

MATERIAL EXAMINED.

Holotype ♂, UGANDA: 'Mpanga Forest, Mpigi, Apr. 1959, T. H. E. Jackson', dissection no. NHB. 1967–2655, B.M. Type No. Rhop. 17257.

Paratypes. UGANDA: allotype ♀, Katera, Sango Bay, Masaka, –.xi.1954 (*T. H. E. Jackson*), B.M. Type No. Rhop. 17258; 1 ♂, Mambigambo Forest, L. Edward, –.ii.1956 (*T. H. E. Jackson*); 4 ♂, 1 ♀, Bwamba, various dates (*T. H. E. Jackson*); 3 ♂, 2 ♀, Budongo, various dates (*T. H. E. Jackson*); 1 ♂, 1 ♀, W. shores of Vic. Nyanza, Buddu, 3700 ft, 19–25.ix.1911 (*S. A. Neave*); 2 ♀, N.W. shores of Vic. Nyanza, 3800–3900 ft, 12–15.ix.1911 (*S. A. Neave*); 7 ♂, 2 ♀, Kayonza Forest, Kigezi, various dates (*van Someren*); 4 ♂, 3 ♀, Katera Forest, Masaka, various dates (*van Someren*); 1 ♂, Kamengo, 8.ix.1949 (*van Someren*); 1 ♀, Katera, –.viii.1935 (*T. H. E. Jackson*); 1 ♀, Katera Forest, Mbarara, –.xi-xii.1951 (*van Someren*); 1 ♀, Entebbe Forest, Kitinda, –.vii.1951 (*V. G. L. van Someren*); 1 ♀, Nabogabu, –.ix.1935 (*T. H. E. Jackson*); all in BMNH collection. The following paratypes in collection of H. Stempffer: 10 examples, Kayonza Forest, Kigezi; 5 examples, Bwamba; 3 examples, Budongo Forest, Unyoro; 1 example, Mpigi; 3 examples, Katera; 7 examples, Kagera; all collected by the late T. H. E. Jackson.

***Liptena opaca sankuru* subsp. n.**

(Pl. 1, figs 8, 11; Text-fig. 3)

Recorded from Cameroun and Zaire.

♂. *Upperside*. Ground colour brilliant white. Forewing markings similar to those of *o. ugandana*; the paratypes of *o. sankuru* have a broader outer marginal band than the holotype. Hindwing markings resemble those of *o. ugandana*, the discoidal spot of the underside being visible through the wing; the dark outer marginal band is tapered at the apex and at the anal angle.

Underside. Forewing differs from that of *o. ugandana* in having the pale patch within the dark apical area of lesser extent; the dense discoidal spot on the hindwing is smaller.

Length of forewing : ♂ 15·5 mm. Legs, palpi and antennae as in *o. ugandana*.

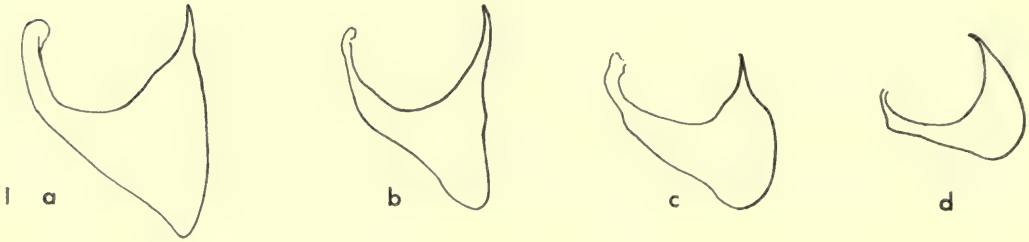
♂ *genitalia*. Similar to those of *o. ugandana*, but the saccus more rounded at the extremity, the ventral process of the valva more slender. The subunci are more slender than those of *o. ugandana*. The aedeagus is shorter and stouter than in *o. opaca*.

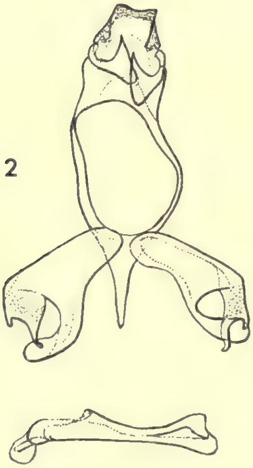
♀. Markings as in ♂. Length of forewing : 15 mm.

MATERIAL EXAMINED.

Holotype ♂, ZAIRE: 'Sankuru, Katako-Kombe, 18.9.1952, Dr M. Fontaine', dissection no. Stempffer 4697 (in Stempffer coll.)

Paratypes. Cameroun: allotype ♀, Bitje, 2000 ft, wet season, 4.v.1912 (*G. L. Bates*), B.M. Type No. Rhop. 17294; 1 ♂, Bitje 13°N. 12°E., wet season, 1926 (*G. L. Bates*) dissection no. NHB. 1959–2716. Zaire: 2 ♂, Katako-Kombe, (*Dr M. Fontaine*) (these specimens in Stempffer coll.); 1 ♂ Takalu, W. of L. Albert, –.iii.–, dissection no. NHB, 1958–2182.





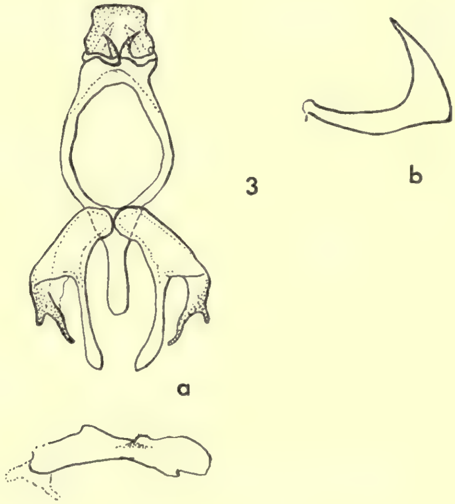


Fig. 1. Subunci of *Liptena opaca* subspecies: (a) *opaca*, (b) *gabunica*, (*c*) *centralis*, (*d*) *ugandana*.

Fig. 2. *Liptena opaca opaca* (Kirby), ♂ genitalia.

Fig. 3. *Liptena opaca sankuru* subsp. n., (a) ♂ genitalia, (b) subuncus, enlarged.

Liptena albomacula Hawker-Smith

(Pl. 1, figs 9, 12; Text-fig. 4)

Liptena albomacula Hawker-Smith, 1933 : 7, ♂♀. 1 ♂, 1 ♀ types, ZAIRE: Katanga, vii. 1925 (BMNH) [examined].

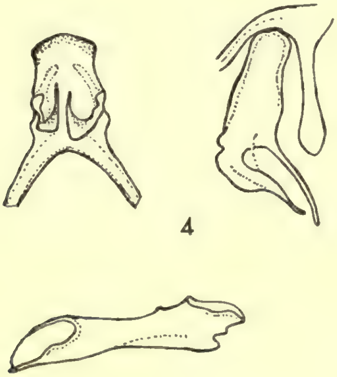
Recorded from Cameroun, Zaire and Uganda.

The types are in the BMNH. The ground colour is pure white. On the forewing upperside is a broad brown costal band extending across the apex and down the outer margin to the tornus. The hindwing bears a brown outer marginal band. On the underside the costal and outer marginal bands are repeated and at the apex of the forewing a patch of white ground colour is present within the brown marking, as in *opaca ugandana*. The hindwing is marked as on the upperside but in addition there is a prominent darker brown discoidal spot. The forewing measures barely 15 mm. Legs orange; palpi brown; antennae black flecked with white, the club tipped with orange.

♂ *genitalia*. Uncus crescentic with a weakly convex distal margin; tegumen wide; subunci angled and dilated in their central part. Vinculum moderately broad with a short saccus. Valvae rectangular, the dorsal process with the basal half of moderate width tapering to a fairly fine rounded tip; there is no hooked projection like that of *opaca opaca*; the ventral process is longer than the dorsal, and slender. Aedeagus large, robust and straight with a strongly dilated distal portion.

MATERIAL EXAMINED.

No material other than the type-specimens was available.



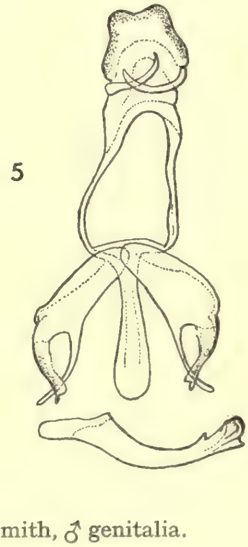


FIG. 4. *Liptena albomacula* Hawker-Smith, ♂ genitalia.

FIG. 5. *Liptena titei* sp. n., ♂ genitalia.

***Liptena titei* sp. n.**

(Pl. 1, figs 13, 16; Text-fig. 5)

We have pleasure in naming this species after our colleague Mr G. E. Tite. *L. titei* is similar in facies to *opaca ugandana* but the male genitalia more closely resemble those of *albomacula*.

♂. *Upperside.* Ground colour light cream – almost white. Forewing with a broad blackish brown costal band showing a slight projection at the end of the cell. The outer marginal band is somewhat wider. Hindwing with an outer marginal band and a few scales around the discoidal vein, blackish brown. The extent of the discoidal marking is individually variable.

Underside. As upperside, but the outer marginal band on the forewing is narrower. This species differs from *opaca ugandana* by the almost complete absence of the pale patch at the apex of the forewing within the brown coloration. On the hindwing, in addition to the broad outer marginal band, is a large discoidal spot.

Length of forewing: 16 mm. Legs orange; palpi dark brown, antennae black, flecked with white, the whole of the club orange.

♂ *genitalia.* Uncus elongated, slightly broader at base, the distal margin weakly concave; tegumen large. Subunci long and uniformly slender. Vinculum moderately broad with a long saccus that broadens towards the free end. Valvae rectangular, the dorsal process excised at the tip, the ventral process long and slender. Aedeagus strongly curved with a projection on both the dorsal and ventral surfaces just before the tip, which is bilobed.

♀. The costal and outer marginal bands on the upperside tend to be narrower than in the ♂. Length of forewing as in the ♂.

MATERIAL EXAMINED.

Holotype ♂, NIGERIA: 'Obubra, Abakaliki Prov., Nov. 1960, T. H. E. Jackson', dissection no. NHB. 1967–2668, B.M. Type No. Rhop. 17259.

Paratypes. NIGERIA: allotype ♀, as holotype, B.M. Type No. Rhop. 17260; 1 ♂, Eleala, Pt. Harcourt, –.xi.1958 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Bassa Prov., Cator coll.; 1 ♂, Oban, –.i.1921, Cator coll.; 1 ♂, Akamkpa, Calabar Prov., –.x.1958 (*T. H. E. Jackson*); 2 ♂, 1 ♀, Ikom, Ogoja Prov., various dates; 1 ♂, Adiabo,, –.v.1920, Cator coll. CAMEROUN: 1 ♂, Mamfe, –.ix.1956 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Mamfe, –.xi.1956 (*T. H .E Jackson*); 1 ♀, Mamfe, – xii.1956 (*T. H. E. Jackson*); 3 ♂, Johann Albrecht's Hohe Station 1896 (*L. Conradt*) Oberthür coll.; 1 ♀, Kumba, –.v.1956 (*T. H. E. Jackson*); 1 ♀, Mile 29 Victoria-Kumba, –.iv.1955 (*T. H. E. Jackson*). IVORY COAST: 1 ♂, Tiassale, Abidjan, –.viii.1965 (*T. H. E. Jackson*).

***Liptena griveaudi* Stempffer**

(Pl. 1, figs 14, 17; Text-fig. 6)

Liptena griveaudi Stempffer, 1969 : 937, figs 20–22, ♂♀. Holotype ♂, IVORY COAST: Anguédédou (*P. Griveaud*) (Stempffer coll.) [examined].

This species is quite different from the other *Liptena* species that inhabit this region. The external characters are distinctive and the male genitalia exhibit an unusually shaped valva. Recorded from Ivory Coast only.

The ground colour is white on both surfaces and the sooty markings have a rather smudged appearance. On the *upperside* the costal band of the forewing is so broad that it covers almost the whole of the discoidal cell. The outer marginal band is only a little broader than the costal band. The discoidal marking is large and square, but is incorporated into the costal band. On the hindwing the outer marginal band is moderately narrow and does not reach the anal angle. The discoidal marking is large and squarish, as on the forewing; however, the oval outline of the discoidal spot on the underside, which is larger, is visible through the wing.

On the *underside* the basal half of the costal band is not as broad as on the upperside. The outer marginal band is narrower towards the tornus than on the upperside. The discoidal patch is more pronounced. Hindwing as upperside, but the discoidal spot even larger.

♂ *genitalia*. Uncus rectangular with a blunt median point, the lateral angles rounded; tegumen rather narrow. Subunci short, only very slightly curved, and hooked towards the tip. Vinculum slender, prolonged by a strongly spatulate saccus. Valvae very distinctive, the two processes are widely separated distally, both processes semi-membranous, the dorsal one terminating in a sharp point, the ventral process truncated with a small tooth near the apex. Aedeagus long, cylindrical and curved; on the dorsal surface a small tooth is present just before the extremity.

MATERIAL EXAMINED.

♂ holotype, data given above. Allotype ♀, IVORY COAST: Adiopodoumé (*P. Griveaud*); other paratypes as cited in original description.

Liptena confusa Aurivillius

(Pl. 1, figs 15, 18; Text-fig. 7)

[*Larinopoda muhata* Dewitz; Grose-Smith & Kirby, 1887 : 1, pl. 2, figs 3, 4. Misidentification.]
Liptena confusa Aurivillius, 1899 : 276. Holotype ♀, CAMEROUN (possibly in BMNH, see below).

Grose-Smith & Kirby (1887) described an insect they believed to be the female of *Larinopoda muhata* Dewitz (1886 : 428, pl. 2, figs 6, 6a), but it was not this

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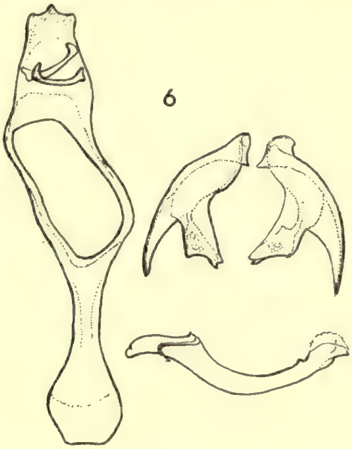

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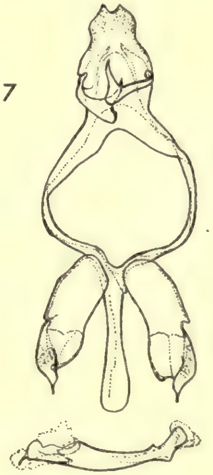

FIG. 6. *Liptena griveaudi* Stempffer, ♂ genitalia.
FIG. 7. *Liptena confusa* Aurivillius, ♂ genitalia.

species. The misalliance was discovered by Aurivillius who then renamed the female *confusa*. In the BMNH collection is a female specimen from Grose-Smith's collection which could possibly be the type. In facies it agrees with the figures given by Grose-Smith & Kirby (1887 : pl. 2, figs 3, 4). The labels read 'Cameroons' 'Ex Grose-Smith 1910'. Three males in the BMNH collection agree well with this female, and possess genitalia distinct from those of any other species of white *Liptena*.

Recorded from Cameroun only.

♂. *Upperside*. Ground colour white – markings dark brown. Forewing with a broad, costal band, the discoidal mark hidden within it. Outer marginal band of approximately the same width as the costal band. Hindwing with an outer marginal band of similar width and a small discoidal spot.

Underside. Ground colour white – brown markings less densely scaled than on upperside. Forewing with both bands narrower than those of the upperside; the outer marginal band does not quite reach the tornus. The discoidal mark is more noticeable and there is a small projection from the costal band just beyond it. Hindwing with the outer marginal band slightly narrower than on upperside and prominent oval discoidal spot, larger than that of the upperside.

Length of forewing: 16 mm. Legs orange with some brown scaling, the ungulae brown; palpi black; antennae black, flecked with white; we have no examples that have a club.

♂ *genitalia*. The distinctive uncus is rather elongate and conical with a rounded excision at the apex. Tegumen oval. Subunci curved, narrow at base, reminiscent of a cobbler's last but with a more exaggerated heel. Vinculum broad, prolonged by a broad angular saccus. Valvae rectangular, the dorsal process broad with a finger-like apex; the ventral process very slender. Aedeagus long and gently curved with a small tooth on the dorsal surface, and a larger blunt projection on the ventral surface.

MATERIAL EXAMINED.

CAMEROUN: 1 ♀, 'Cameroons', ex Grose-Smith, 1910; 1 ♂, Mamfe, –.x.1956 (*T. H. E. Jackson*); 2 ♂, Mile 29 Victoria-Kumba, –.iv.1965 (*T. H. E. Jackson*); 1 ♀, Bitje, dry season, 1913: 1 ♀, Mamfe, –.xii.1956 (*T. H. E. Jackson*).

Liptena ouesso sp. n.

This new species found in Cameroun and Congo (Brazzaville) is noticeably different from other species of *Liptena* that have a dark outer marginal band on hindwing upperside, because it has a cream ground colour.

In facies this species is quite like a small example of *titei*; however, the male genitalia differ widely. The subunci of *ouesso* are unusual, the only other forms with similar subunci are *rochei* and *submacula tringa*. Externally the cream ground colour easily distinguishes *ouesso* from *s. tringa*, which has a white ground and lacks the pale apical patch on the forewing underside.

Liptena ouesso ouesso subsp. n.

(Text-figs 8, 9b)

♂. *Upperside*. Ground colour light cream – markings blackish brown. Forewing with the broad costal band invading the cell; confluent with the band is a small discoidal streak. The apical and outer marginal areas are broadly blackish brown, the outer marginal band narrows slightly at the tornus. Hindwing showing a broad outer marginal band of approximately 3 mm width, tapering to a point at the anal angle. The discoidal spot of the underside is visible through the wing. Fringes of all wings blackish.

Underside. Ground colour whiter than that of the upperside – the bands dark brown. Forewing with the costal band slightly narrower than on the upperside. The light ground colour breaks through the dark apical coloration as an indistinct whitish patch. Outer marginal band somewhat narrower than that of upperside. Hindwing with the blackish discoidal spot prominent. Outer marginal band as on upperside, but the dark coloration not as intense. There is a pair of black marginal lines divided by a fine white line on all wings. Fringes as upperside.

Length of forewing: 14 mm. Legs orange with black ringing on the tarsi; palpi blackish; antennae black with white lateral flecking, the club black – dull orange below and at the tip.

♂ *genitalia.* Uncus crescentic with a straight distal margin, produced at the angles; tegumen oval; the distinctive subunci are in the form of a horizontal letter 'Y', the lower arm of the Y more slender than the upper, and slightly upcurved. Vinculum of moderate width with a long saccus. Valvae rectangular; the dorsal process of average width at the base, then narrowing sharply to terminate in a blunt point; the ventral process very slender. Aedeagus longer than the valva, slender in the central part and dilated at the tip. It is distinct from that of any other species in the group.

♀. As the ♂ but sometimes larger (length of forewing: 17 mm).

MATERIAL EXAMINED.

Holotype ♂, CONGO (BRAZZAVILLE): 'Republic of Congo Brazzaville, Ouesso, Ketta Forest, november december '59, T. H. E. Jackson.'

Paratypes. CONGO (BRAZZAVILLE): allotype ♀, as holotype (both in Stempffer coll.); 2 ♂, 3 ♀, Kelle (*T. H. E. Jackson*) (in Stempffer coll.); 1 ♀, Kelle, –.x.1963 (*T. H. E. Jackson*); 1 ♀, Etoumbi, –.x.1960 (*T. H. E. Jackson*). CAMEROUN: 1 ♂, Bitje, early May & June, wet season; 1 ♂, Ja River (*G. L. Bates*).

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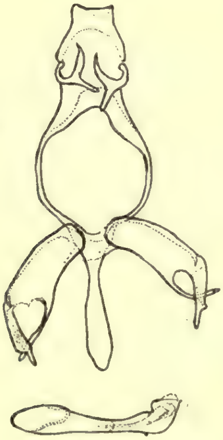


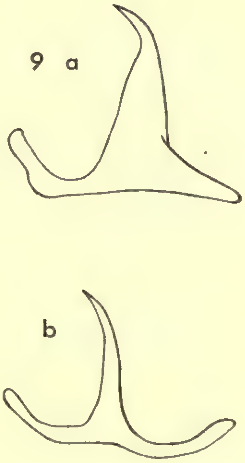


FIG. 8. *Liptena ouesso ouesso* sp. n., ♂ genitalia.

FIG. 9. Subunci of (a) *Liptena ouesso mayombe* subsp. n., (b) *L. ouesso ouesso* subsp. n.

Liptena ouesso mayombe **subsp. n.**

(Pl. 1, figs 19, 20; Text-fig. 9a)

This subspecies differs from the nominate subspecies by its larger size and heavier dark markings. The cream ground colour is deeper than in associated species.

♂. *Upperside*. Ground colour creamy white, the blackish brown costal band and outer marginal bands as in *o. ouesso* but of greater width. On the hindwing the discoidal spot of the underside is visible through the wing; in addition the paratype ♂ shows some brown scaling on the upperside at the discoidal vein.

Underside. Ground colour whiter than that of the upperside. Forewing with the brown costal band very broad, covering almost one-half of the discoidal cell. At the apex of the forewing is a white patch almost enclosed within the brown markings; this is larger than in the nominate race. The outer marginal band is narrower than that of the upperside. On the hindwing the discoidal spot is massive, much larger and rounder than that of *o. ouesso*. The outer marginal band is of the same width as that of the upperside.

Length of forewing: 16 mm. Legs and palpi as in *o. ouesso*; antennae black with white lateral flecking, the club tipped with dull orange.

♂ *genitalia*. Differs from *o. ouesso* in the form of the subunci which are more dilated centrally and have a shorter apophysis.

♀. Unknown.

MATERIAL EXAMINED.

Holotype ♂, CONGO (BRAZZAVILLE): 'Mayombe, M'vouti, Rep. du Congo, Jan. 1962, T. H. E. Jackson', dissection no. NHB. 1967–2620, B. M. Type No. Rhop. 17261.

Paratype ♂, as holotype, dissection no. NHB. 1967–2621, B. M. Type No. Rhop. 17262.

Liptena submacula Lathy

Liptena submacula Lathy, 1903 : 196, pl. 8, fig. 6.

L. submacula is distributed through western Africa from Sierra Leone eastwards to Nigeria. In Nigeria the range of *s. submacula* overlaps the range of *o. opaca*; it is distinguished from *o. opaca* by the absence of discoidal markings on the hindwing upperside; the discoidal marking on the hindwing underside is also smaller in *s. submacula* than in *o. opaca*, but the structural differences in the male armature provide definite characters for separation, the difference between the uncus and valvae of the species being quite striking.

Liptena submacula submacula Lathy

(Pl. 2, figs 21, 24; Text-fig. 10)

Liptena submacula Lathy, 1903 : 196, pl. 8, fig. 6, ♀. Holotype ♀, NIGERIA: Ogruga (BMNH) [examined].

The female holotype of *submacula* is in the BMNH and unfortunately is rather worn. The series in the BMNH is from Nigeria. A male neallotype is described here.

♂. *Upperside.* Ground colour white, markings blackish brown. Forewing with the broad costal band invading the cell, curving across to form an even wider outer marginal band. Hindwing with a broad outer marginal band. The discoidal spot of the underside is visible through the wing.

Underside. Coloration as on upperside. Forewing with the costal band as on the upperside but the outer marginal band narrower than that of the upperside. Hindwing outer marginal band of the same width as on upperside. The hindwing shows a prominent discoidal spot.

Length of forewing: 15 mm. Legs orange with some black ringing, some orange coloration present on the underside of the thorax also; palpi black; antennae black, flecked with white, the club tipped with orange.

♂ *genitalia.* Uncus bifid, the two parts separated by a deep, rounded depression; the lateral angles are acute. Tegumen trapezoidal. Subunci long, curved and slender. Vinculum rather narrow, with a long saccus. Valvae rectangular; the dorsal process broad in its basal two-thirds and tapering sharply to end in a point; the ventral process very narrow and flexible. Aedeagus with a tooth on the dorsal surface and a larger one on the ventral surface near the tip.

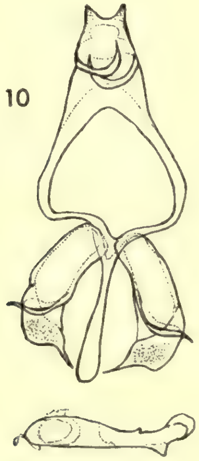
♀. The females of *submacula* have narrower outer marginal bands on all wings than the males.

The range of *s. submacula* overlaps that of *titei* and appears to abut on to that of *s. tringa*; however, it is easily separated from both due to the absence of discoidal spots on the upperside.

MATERIAL EXAMINED.

♀ holotype, data given above.

NIGERIA: ♂ neallotype, 'Oshodi, Lagos Distr., April 1955, T. H. E. Jackson',



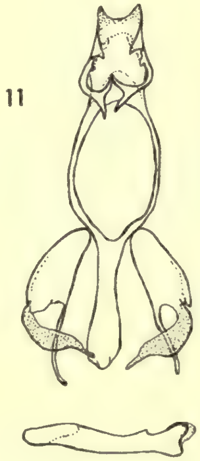


FIG. 10. *Liptena submacula submacula* Lathy, ♂ genitalia.

FIG. 11. *Liptena submacula tringa* subsp. n., ♂ genitalia.

dissection no. NHB 1967–2636, B.M. Type No. Rhop. 17263; 3 ♂, 2 ♀, Oshodi, Lagos Distr., iv. 1955 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Warri, Niger C.P., –.v.1897 (*Dr Roth*); 1 ♂, Warri, Niger C.P., –.vi.1897 (*Dr Roth*); 1 ♂, Warri, Niger C.P., –.x.1897 (*Dr Roth*); 1 ♂, Lagos (*Dr P. Roche*); 2 ♂, 1 ♀, Gambari Forest, 13.viii.1969 (*T. B. Larsen*); 1 ♂, Omo Forest, end of May 1969 (*T. B. Larsen*); 1 ♂, Olokemeji, 24.viii.1969 (*T. B. Larsen*); 1 ♂, Lagos (*Maloney*); 1 ♀, Mamu Awka, Onitsha Prov., –.i.1959 (*T. H. E. Jackson*); 1 ♀, Mamu Awka, Onitsha Prov., –.iii. 1960 (*T. H. E. Jackson*); 1 ♀, northern Nigeria, Maidugari, 6.i.1945; 1 ♀, western Nigeria, Elesha, –.viii.1935 (*C. L. King*); 1 ♀, southern Nigeria, Osbogbo, 25.iv.26.

***Liptena submacula tringa* subsp. n.**

(Pl. 2, figs 22, 25; Text-fig. 11)

This subspecies is recorded from Ivory Coast and Ghana. It is easily separated from *griveaudi*, also from Ivory Coast, by the smaller discoidal marks on all wings. *L. s. tringa* might be confused with *titei*, which is found in Ivory Coast, but it tends to have narrower marginal bands than *titei* and a larger discoidal spot on the underside hindwing. *L. s. tringa* differs from *s. submacula* by the following external characters: on the forewing upperside the costal band of *s. tringa* covers almost the entire cell, whereas in *s. submacula* it is not as extensive; discoidal marks are present on the upperside of all wings of *s. tringa*, whereas *s. submacula* rarely shows any discoidal markings on the upperside.

♂. *Upperside*. Ground colour white – markings blackish brown. Forewing with the costal band very broad, extending from the inner margin at the base of the wing and covering the whole of the discoidal cell. There is a small discoidal streak. Outer marginal band of nearly uniform width, approximately 4 mm. Hindwing showing a broad outer marginal band and a light discoidal mark; the discoidal spot of the underside visible through the wing. Fringes blackish brown.

Underside. Ground colour white, the brown markings less densely scaled than those of the upperside. Forewing with the costal and outer marginal bands narrower than on the upperside. A pair of black marginal lines divided by a fine white line is present on all wings. Hindwing with the outer marginal band only slightly narrower than on the upperside. The discoidal spot is oval and very prominent.

Length of forewing: 15 mm. Legs orange, the ungulae black on the meso- and meta-thoracic legs; palpi black; antennae black, flecked with white, the club tipped with orange.

♂ *genitalia*. As in typical *submacula* except for the subunci which are in the form of a shallow, horizontal letter '**Y**'.

♀. Unknown.

MATERIAL EXAMINED.

Holotype ♂, IVORY COAST: 'Abagourou, Côte d'Ivoire, Apr. 1967, T. H. E. Jackson', dissection no. NHB. 1967–2634, B.M. Type No. Rhop. 17264.

Paratypes. GHANA: 1 ♂, Ashanti, –.iv.1908 (*G. C. Dudgeon*), dissection no. NHB. 1959–2167, B.M. Type No Rhop. 17265; 1 ♂, Ashanti, –.iii.1901, dissection no. NHB. 1959–2166, B.M. Type No. Rhop. 17266.

***Liptena submacula maesseni* subsp. n.**

(Pl. 2, figs 23, 26; Text-fig. 12)

Known only from Ghana.

♂. *Upperside.* Ground colour white – markings dark brown. Forewing with the costal band of uniform width, enveloping the fine discoidal streak. The outer marginal band broader than in *s. submacula*, approximately 4 mm in width at the tornus. Hindwing with a broad outer marginal band. The discoidal spot of the underside is visible through the wing.

Underside. Colouring as on upperside. Forewing with the costal band and discoidal streak as on upperside, but the outer marginal band narrower than on upperside. A pair of fine, black, outer marginal lines separated by a fine paler line is present on all wings. Hindwing with the outer marginal band of the same width as that of the upperside. The discoidal spot very dense and precise, oval, and much larger than in *s. submacula*. The humeral lobe and the anal fold are edged with orange.

Length of forewing: ♂ 17 mm. Legs orange with some black ringing, some orange coloration present on the underside of the thorax also; palpi black; antennae black, flecked with white, the club tipped with orange.

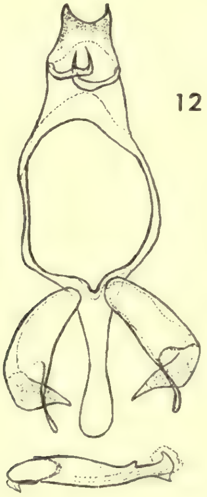
♂ *genitalia.* Differ from *s. submacula* only in the subunci which are more curved and swollen in their middle part.

♀. Markings as in ♂. Length of forewing: 13 mm.

MATERIAL EXAMINED.

Holotype ♂, GHANA: 'Ho, 3 January 1954, Th. Maessen leg', dissection no. 6315 (Stempffer).

Paratypes. GHANA: allotype ♀, Kpandu, 30.iii.1950 (*Th. Maessen*) (holotype and allotype in Stempffer coll.); 1 ♂, Pampavie, 5.viii.1961 (*Th. Maessen*), dissection no. 6156 (Stempffer) (in BMNH); 3 ♂, 2 ♀, Likpe, various dates (*Th. Maessen*) (in MRAC, Tervuren); other specimens in Maessen coll.



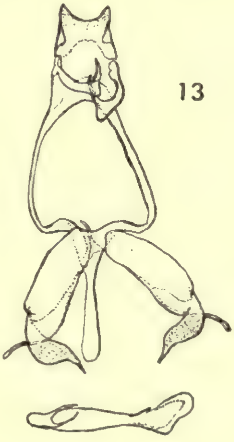


FIG. 12. *Liptena submacula maesseni* subsp n., ♂ genitalia.

FIG. 13. *Liptena submacula liberiana* subsp. n., ♂ genitalia.

Liptena submacula liberiana subsp. n.

(Pl. 2, figs 27, 30; Text-fig. 13)

Recorded from Ivory Coast, Liberia and Sierra Leone.

L. s. liberiana is easily separated from *s. tringa*, the more easterly subspecies of *submacula*, *s. tringa* being a smaller insect and having the dark costal band obscuring the whole of the cell of the forewing upperside; in *s. tringa* the outer marginal band of the forewing is considerably narrower on the underside than on the upperside, which in *s. liberiana* is not true to such an extent; *s. liberiana* also bears a much larger discoidal spot on the underside hindwing.

L. titei is close in facies but differs in having the whole of the antennal club orange, whilst in *s. liberiana* it is black, tipped with orange. The discoidal spot on the underside hindwing in *s. liberiana* is larger and the male genitalia differ markedly.

From *griveaudi*, which occurs in Ivory Coast, it is distinguished by the absence of the large discoidal marks on the upperside which make *griveaudi* so striking.

♂. *Upperside.* Ground colour white – markings dark brown. Forewing with a broad brown costal band which obscures the greater part of the cell at the base, and extends to the inner margin. There is a minute discoidal streak confluent with the costal border. The inner edge of the outer marginal band is rather straight, and the band itself a little broader than the costal band. Hindwing with the discoidal spot of the underside clearly visible through the wing. The outer marginal band is approximately 3mm broad, tapering towards the anal angle.

Underside. As upperside, except that the outer marginal band of the forewing is less broad, and tapers off towards the tornus. The discoidal spot on the hindwing is very large and oval.

Length of forewing: 14·5 mm. Legs orange, the ungulae black; palpi black; antennae black with white flecking, the club black and tipped with orange.

♂ *genitalia.* Uncus trapezoidal, the distal margin bearing a deep, rounded excision. Subunci curved, in the shape of a cobbler's last like those of *confusa*. Tegumen oval. Vinculum narrow with a long spatulate saccus. Valvae and aedeagus as in the nominate race.

♀. Larger than the ♂ (length of forewing: 17 mm), but with similar markings.

MATERIAL EXAMINED.

Holotype ♂, LIBERIA: 'Kpaine, 1400 ft, (7°10′ N. 9°7′ W.), 25.2.1954, Dr W. Peters leg,' dissection no. 4506 Stempffer, B. M. Type No. Rhop. 17267.

Paratypes. LIBERIA: 2 ♂, as holotype, 18.iii.1954. IVORY COAST: 1 ♂, Tiassale, Abidjan, –.viii.1965 (*T. H. E. Jackson*); 1 ♀, Tiassale, Abidjan, –.x.1965 (*T. H. E. Jackson*); 3 ♂, 5 ♀, Tiassale (*T. H. E. Jackson*) (Stempffer coll.); 1 ♂, Ivory Coast, Cramer, 1919; 2 ♀, Bayota Forest, Gagnoa, 1966 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Bayota Forest, Gagnoa (*T. H. E. Jackson*) (Stempffer coll.); 2 ♀, Bingerville, 1915 (*G. Melou*); 1 ♀, Issia (*T. H. E. Jackson*) (Stempffer coll.); 1 ♂, 1 ♀, Tiassale, –.ix.1967 (*T. H. E. Jackson*); 1 ♂, Danane, Mt. Nimba, –.xi.1967 (*T. H. E. Jackson*). SIERRA LEONE: allotype ♀, Moyamba, 11.vi.1903, Cator coll., B. M. Type No. Rhop. 17268; 5 ♂, 1 ♀, as allotype, various dates, Cator coll.; 1 ♂, 1 ♀, Moyamba, Adams coll.; 1 ♀, Moyamba, 17.v.1903, Bethune-Baker coll.; 1 ♂, Moyamba, 21.x.1903, Cator coll.; 1 ♂, Baima, 22.iv.1903, Cator coll.

Liptena fatima (Kirby)

(Pl. 2, figs 28, 29, 31, 32; Text-fig. 14)

Tingra fatima Kirby, 1890 : 268, ♂ ♀. ♂, ♀ syntypes, CAMEROUN (probably destroyed).
Tingra fatima Kirby; Grose-Smith & Kirby, 1891 : pl. 15, figs 8, 9, ♀.

Specimens in the BMNH collection are from Nigeria, Cameroun, Fernando Po, Gabon, Congo (Brazzaville) and Zaire. The specimens from Nigeria differ from those from other parts of the range by their smaller size, paler ground colour, reduced apical marking and fainter discoidal spots. Intermediate examples exist.

♂ genitalia. Very similar to that of *alluaudi* and *albicans*. Uncus broadly crescentic with a small excision at the centre of the distal margin. Subunci long, slender with incurved apices, occasionally furnished with a projection on the lower margin near the base. Vinculum narrow with a long spatulate saccus. Valvae triangular, the dorsal process directed downward, the ventral process large and broadly rounded. Aedeagus small, parallel-sided with a small tooth midway along the ventral margin.

♀. Markings as in ♂.

MATERIAL EXAMINED.

NIGERIA: 1 ♂, Onitsha, Awka Mamu Forest, –.iii.1959 (*T. H. E. Jackson*); 1 ♂, Akpabuyo, –.i.1921, D. Cator coll.; 1 ♀, Akpabuyo, –.vii.1920, Cator coll.; 1 ♂, 1 ♀, Eket, 25.iii.1920, D. Cator coll,; 1 ♀, Eket, 20.iii.1920, D. Cator coll.; 2 ♂, Oban, –.v.1920, D.Cator coll.; 1 ♀, Oban, –.i.1921, D. Cator coll.; 1 ♂, Uwet, –.v.1920, D. Cator coll.; 1 ♂, Uwet, –.x.1920, D. Cator coll. CAMEROUN: 11 ♂, 2 ♀, Johann Albrecht's Hohé Station, 1896 (*L. Conradt*); 2 ♂, Barombi, Grose-Smith coll.; 1 ♂ Sakbayeme (*G. Schwab*); 2 ♂, Mile 29 Victoria-Kumba, –.iii.1955 (*T. H. E. Jackson*); 2 ♂, Mamfe, –.xi.1956, (*T. H. E. Jackson*); 2 ♂, Bitje, Ja River, –.iii.1912 (*G. L. Bates*); 1 ♀, Bitje, –.iii.– (*G. L. Bates*); 1 ♀, Bitje, –.iv-v.1909, wet season, Adams coll.; 1 ♂, Bitje, wet season, –.iv-v.1909; 1 ♂, 1 ♀, Bitje, Ja River, 2000 ft, wet season, –iv.v.1912, (*G. L. Bates*); 2 ♂, Bitje, Ja River, 3° N., 12° E., wet season, 1926 (*G. L. Bates*); 1 ♂, Bitje, Ja R., –.iv-vi.1910, lesser rains (*G. L. Bates*); 1 ♂, 2000 ft, smaller rains, (*G. L. Bates*); 1 ♀, Bitje, wet season, 1913; 4 ♂, 1 ♀, Bitje, Ja River, early May & June, wet season (*G. L. Bates*); 1 ♀, Bitje, –.vi–vii.1909, dry season, Adams coll.; 1 ♀, Bitje, –.ix.'08, Adams coll.; 2 ♂, 2 ♀, Bitje, 2000 ft, –.ix-x-xi.1911; 3 ♂, 1 ♀, Bitje, Ja River, 2000 ft, –.x-xi.1912 (*G. L. Bates*); 5 ♂, Bitje, Ja River, 2000 ft, –.x-xi.1913, wet season (*G. L. Bates*); 1 ♂, Bitje, 2000 ft, –.xi.1909, Bethune-Baker coll.; 2 ♂, Bitje, dry season, 1913; 3 ♂, 1 ♀, Bitje, Ja River, dry season, (*G. L. Bates*); 2 ♀, Bitje, 2000 ft, (*G. L. Bates*); 3 ♂, Bitje, (*G. L. Bates*); 1 ♂, 1 ♀, Bitje, Ja River, 2000 ft, 1915 (*G. L. Bates*). FERNANDO PO: 1 ♂ Hewitson coll. GABON: 1 ♀, Kuilu, 1892 (*Mocquerys*); 1 ♂, Ogowe, Bethune-Baker coll.; 1 ♂, Ogowe, Godman & Salvin coll.; 2 ♂, Lake Asebbe, Fernan Vaz, –.i.'08 (*Dr Ansorge*); 2 ♂, 1 ♀, Gabon, Rothschild coll. CONGO (BRAZZAVILLE): 1 ♂, Etoumbi, –.xi.1958 (*T. H. E. Jackson*); 1 ♀, Ouesso Forest, Ketta, –.xi.1959 (*T. H. E. Jackson*); 1 ♂, Mambili Forest, Ouesso, –.vi.1959 (*T. H. E. Jackson*). ZAIRE: 1 ♀, Beni, 4000 ft, –.x.1946 (*T. H. E. Jackson*); 1 ♂, Beni, Ituri, 4000 ft,

–.viii.1947 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Irumu, Ituri, 4000 ft, –.vi.1947 (*T. H. E. Jackson*); 1 ♂, Upper Kasai District (*P. Landbeck*); 1 ♂, Katanga; 2 ♂, Osa-Lowa Watershed, –.viii.1921 (*T. A. Barns*); 2 ♂ ,West Semliki Valley, 3500 ft, –.vi.1924, forest (*T. A. Barns*); 1 ♀, Congo Forest, –.vii.1907 (*A. F. R. Wollaston*).

Liptena albicans Cator

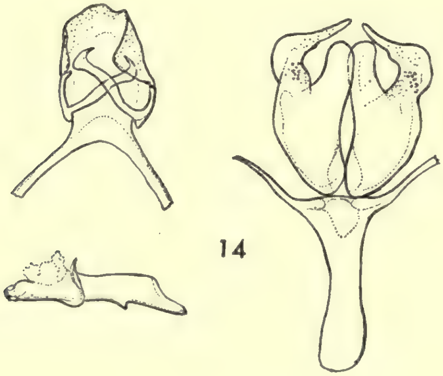
(Pl. 2, figs 33, 36; Text-fig. 15)

Liptena albicans Cator, 1904 : 76, ♂♀. Holotype ♂, SIERRA LEONE: Kholifa, 9.xii.1903 (BMNH, dissection no. NHB 1953–1080) [examined].

Recorded from Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana and Nigeria. The expanse of the wings of the male holotype is 28 mm, the forewing length 14 mm; the wing-expanse of the female allotype is 31 mm and the forewing length 15 mm. The types were taken *in copula*.

The male genitalia of *albicans* and *alluaudi* are rather similar but the two species are easily separated on their external characters. *L. albicans* has the same ground colour as *alluaudi* but has the apical patch much larger.

L. albicans could be confused with the very lightly marked Nigerian specimens of *fatima*; however, these are larger and always possess the discoidal spots – or at least a vestige of them – but these spots are never found in *albicans*. Also, *albicans* is much whiter, does not have the orange scaling at the base of the wings, but has more brown coloration at the base of the costa. The male genitalia are similar.



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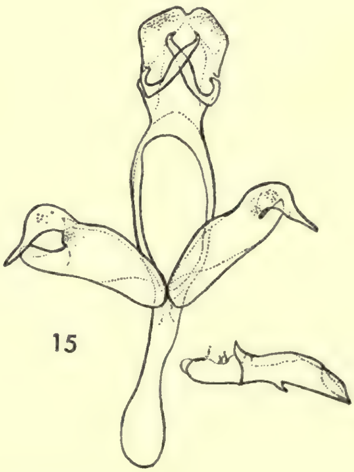

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FIG. 14. *Liptena fatima* (Kirby), ♂ genitalia.

FIG. 15. *Liptena albicans* Cator, ♂ genitalia.

L. albicans is easily separated from *decipiens* by its whiter ground colour and because the form and extent of the apical patch differs. In *decipiens* the legs are black, whereas those of *albicans* are orange with some brown scaling.

In *albicans* and *augusta* the apical patch of the forewing is similar in extent, but as the ground colour of *augusta* is bright white contrasting with the dull cream of *albicans*, the two species are easily distinguishable. In addition, *augusta* has the costa brown throughout its length. The male genitalia differ widely, especially the valvae.

♂ genitalia. Differs from *alluaudi*, to which it is closest, by the following characters: subunci a little shorter and slightly swollen in the middle; saccus usually longer, valvae narrower.

MATERIAL EXAMINED.

♂ holotype, data given above.

GUINEA: 1 ♂, Massadou, near Macenta, 1600 ft, 13–17.v.1926 (*C. L. Collenette*). SIERRA LEONE: ♀ allotype, data as holotype; 1 ♂, Kholifa, 10.vi.1903, Bethune-Baker coll.; 22 ♂, 12 ♀, Kholifa, –.xii.1903, various collections; 1 ♂, Kholifa, –.xii.1902, ex Oberthür coll.; 2 ♀, –.i.1901, ex Oberthür coll.; 1 ♂, 1 ♀, –.ii.1901, ex Oberthür coll.; 1 ♀, 12.vii.1903, ex Oberthür coll.; 2 ♂, —.i.1907 (*G. C. Dudgeon*); 1 ♂, Baranga, ii.iv.1903, Bethune-Baker coll.; 3 ♂, Baranga, 19.vi.1903, ex Oberthür coll.; 1 ♂, Baranga 20.vi.1903, D. Cator coll.; 1 ♂, Baranga, 20.vi.1903, Bethune-Baker coll.; 1 ♂, Baranga, 1903, Adams bequest; 1 ♂, Fula Wusu, 17.iv.1903, Bethune-Baker coll.; 1 ♂, 1 ♀, Ybeng, 5.iii.1903, D. Cator coll.; 1 ♂, Tani, 14.vi.1903, Adams bequest; 1 ♂, Tani, 16.vi.1903, ex Oberthür coll.; 1 ♂, Tani, 20.vi.1903, D. Cator coll.; 1 ♀, Tani, 12.vii.1903, Adams bequest. LIBERIA: 2 ♂, 12 miles east of Monrovia, –.iii.1926 (*Portal Hyatt*); 1 ♀, 30 miles east of Monrovia, 200 ft, dry season, –.ii.1926 (*M. Portal Hyatt*); 2 ♂, Kpaine, 1400 ft, 7°10′ N., 9°7′ W., 4 iii.1954 (*Dr W. Peters*); 2 ♂, Kpaine, 1400 ft, 14.iii.1954 (*Dr W. Peters*). IVORY COAST: 1 ♂, Bingerville, 1915 (*G. Melou*). GHANA: 2 ♂, Kumawu, 15.i.1938 (*C. S. Cansdale*); 1 ♂, 1 ♀, Aburi, 5.ii.1945 (*K. M. Guichard*); 1 ♂, 1 ♀, Western Province, under 100 ft, –.iii.1928 (*P. Hyatt*); 1 ♂, Kuisa, Ashanti, –.ii.1896, coll.Don.; 1 ♂, Ashanti, Kuisa, (*Major Donovan*); 1 ♂, West Ashanti, –.i.1910; 2 ♂, Ashanti, –.iii.1901; 1 ♂, Bumpata, Ashanti; 1 ♂, Ashanti, –.i.1908 (*Dudgeon*); 1 ♂, Ashanti, –.iii.1907 (*G. C. Dudgeon*); 1 ♂, Ashanti, Cape Coast C. to Kumasi, —.i-ii.1896 (*Capt. H. N. Grosvenor Hood*); 2 ♂, 1 ♀, Kumasi, i.i.1913 (*J. D. G. Saunders*); 1 ♂, Kumasi, 4.ii.1913 (*J. D. G. Saunders*); 1 ♂, Kumasi, 23.ix.1913 (*J. D. G. Saunders*); 1 ♀, Accra; 2 ♀, —.iii.1901; 1 ♀, Sunyani, Kumasi, 1913.

Liptena alluaudi Mabille

(Pl. 2, figs 34, 37; Text-fig. 16)

Liptena alluaudi Mabille, 1890 : 23, pl. 2, fig. 2, ♂. Holotype ♂, IVORY COAST: Assinie (BMNH) [examined].

The series in the BMNH collection is from Guinea, Ivory Coast and Nigeria.

L. alluaudi is similar to the lightly marked Nigerian examples of *fatima* with which it could easily be confused; however, *alluaudi* is smaller, whiter, and never has any trace of discoidal spots. The male genitalia are of the same general structure.

It differs from *batesana* in being less white and in having a smaller apical patch. The male genitalia also differ.

L. alluaudi is frequently confused with *augusta* although there are many points of difference between them. The range of the two species may overlap but we have no specimens with data that substantiate this supposition. On comparison *alluaudi* and *augusta* show the following differences: on the upperside *alluaudi* is creamy white with some light brown scaling at the base of the costa, and the small apical patch not extending beyond vein 4; the ground colour of *augusta* is clear white and the costa is broadly brown from the base of the wing to the apical patch, which covers a much greater area than that of *alluaudi*, and terminates between veins 2 and 3. On the hindwing a marginal line is usually present in *augusta* but is not found in *alluaudi*. On the underside the ground colour of *alluaudi* is white, washed with light yellow, which is more intense at the base of the costa. The under surface of *augusta* is white and bears more markings than that of *alluaudi*; scattered fuscous scales are present along the costa. On the forewing of *alluaudi* the fringe is entirely brown in the region of the apical patch; there is a yellow marginal line and a blackish brown submarginal line which extend as far as vein 4. *L. augusta* has the basal portion of the fringe of the forewing brown with white tips; it also has the yellow marginal line and the blackish brown submarginal line, as in *alluaudi*, but these extend further down the wing and reach vein 2. In addition *augusta* has an irregular fuscous line and an oblique line within the apical area. The hindwing of *alluaudi* bears a yellow marginal line which is duplicated by a second fuscous line. The markings of *augusta* are variable, especially on the underside. In well-marked specimens, which are usually female, the fringes, marginal and submarginal markings are as on the forewing, although the marginal line is yellow only in the female. In addition there may be another brown line situated 1 mm on the inner side of these. There are occasionally some indistinct traces of lines, which are strongest in the region of the anal fold. The male genitalia of *alluaudi* and *augusta* differ markedly.

♂ *genitalia*. Uncus broadly crescentic with a small depression at the distal margin. Tegumen rectangular. Subunci long, sinuate and very slender. Vinculum narrow, the saccus long and spatulate. Valvae triangular with a large dorsal process directed downwards, the ventral process large and broadly rounded. Aedeagus robust, swelling towards the obliquely cut apex, and bearing a strong tooth on the ventral surface.

MATERIAL EXAMINED.

♂ holotype, data given above.

IVORY COAST: 3 ♂, 2 ♀, Bingerville, –.xi.1913 (*Gaston Melou*); 1 ♀, Bingerville, .iii.1915 (*G. Melou*); 5 ♂, 3 ♀, Ivory Coast, 1919 (*Cremer*), ex Oberthür coll. NIGERIA: 3 ♂, 1 ♀, Ubiaja, Benin Province, –.v.1955 (*T. H. E. Jackson*); 1 ♂, 3 ♀, Ubiaja, Benin Province; 1 ♂, Mamu, Forest Reservation, 14.iv.1961 (*M. A. Cornes*); 1 ♂, Gambari Forest, 13.viii.1969 (*T. B. Larsen*); 1 ♀, Ilaro, Lagos district, –.iv.1955 (*T. H. E. Jackson*); 1 ♀, Olokemeji, Ibadan, –.iv.1955 (*T. H. E. Jackson*).

Liptena batesana Bethune-Baker

(Pl. 2, figs 35, 38; Text-fig. 17)

Liptena batesana Bethune-Baker, 1926 : 390, ♂. Holotype ♂, CAMEROUN: Bitje, Ja River, 2000 ft (*G. L. Bates*) (BMNH, dissection no. NHB 1956–2222) [examined].

In facies this species is closest to *alluaudi* but may be distinguished therefrom by its smaller size, by a comparatively larger apical patch, and by the absence of the orange coloration along the inner border of the apical patch and on the underside.

It differs from *decipiens* by its brilliant white ground colour and reduced apical marking, the ground colour in *decipiens* being creamy white.

From *albicans*, which matches it in size, *batesana* may be distinguished by its smaller apical marking; in addition, *albicans* has a cream ground and a pronounced orange coloration on the underside. Length of forewing: 14 mm.

This species was described from Bitje, Cameroun, and is also known from Congo (Brazzaville) and Uganda.

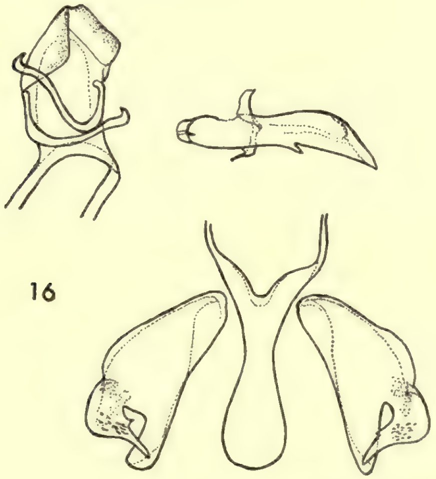
♂ *genitalia*. Uncus crescentic, widely excised at the distal margin. Subunci slender, nearly straight and terminating in a small hook. Tegumen oval. Vinculum narrow, with a fish-tail shaped saccus. Valvae oval, the dorsal process short and ending in a strong tooth; the ventral process much longer and wider with a rounded extremity. Aedeagus slender, nearly straight with an acute tip.

♀. Unknown.

MATERIAL EXAMINED.

♂ holotype, data given above.

UGANDA: 2 ♂, Bwamba, –.vii.1941 (*T. H. E. Jackson*); 1 ♂, Bwamba, –.v.1941 (*T. H. E. Jackson*); 1 ♂, Bwamba, –.iv.1942 (*T. H. E. Jackson*); 1 ♂, Bwamba, –.v.1940 (*T. H. E. Jackson*).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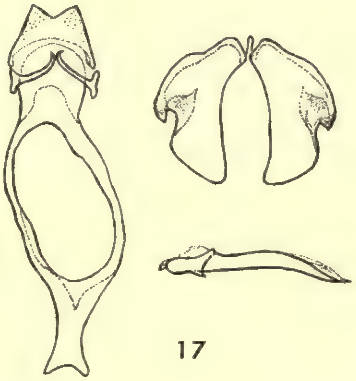
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FIG. 16. *Liptena alluaudi* Mabille, ♂ genitalia.

FIG. 17. *Liptena batesana* Bethune-Baker, ♂ genitalia.

Liptena augusta Suffert

(Pl. 3, figs 41, 44; Text-fig. 18)

Liptena augusta Suffert, 1904 : 50, ♂♀. NEOTYPE ♂, CAMEROUN: Bitje, Ja River, iv–vi. 1910, (*G. L. Bates*) (BMNH), here designated [examined].
Liptena augusta Suffert; Druce, 1910 : pl. 3, figs 2, 2a. [Figure of type.]

This species was once thought to be synonymous with *alluaudi* Mabille (Druce, 1910*b* : 9); the differences between the two species were pointed out by Stempffer (1957 : 212).

Recorded from Ivory Coast, Nigeria, Cameroun and Uganda.

According to the original description the types (1 ♂, CAMEROUN: Lolodorf (*Conradt*); 3 ♀ CAMEROUN: Bipindi (*Zenker*))were in the Berlin Museum; however, Dr Hannemann has informed us several times in the past that their types were destroyed in the last war. Therefore a male neotype is designated here.

♂. *Upperside.* Ground colour white. Forewing with the costa brown throughout its length, the apical patch has an irregular inner edge and extends down the outer margin to vein 2. On the hindwing there is a fine blackish brown marginal line from vein 6 to the anal angle.

Underside. Ground colour white. Forewing with a fine black outer marginal line, a white line of similar width and a further black line running parallel with the others, all terminating at vein 2. There is an undulating brown submarginal line, which is broader, and extends to vein 3. A brown, irregular, oblique band is positioned across the apical region. The hindwing is without markings except for a black line along the outer margin. Fringes fuscous in the region of the apical patch of the forewing, mostly white on the hindwing except at the vein endings where fuscous scales are intermixed with the white.

Length of forewing: 14·5 mm. Legs orange, brown ringed; palpi dark brown, white basally; antennae black, flecked with white, the club black with a pale tip.

♂ *genitalia.* Uncus rectangular with a deeply concave distal margin. Tegumen rounded with a narrow base. Subunci strongly curved, slightly dilated in their centre. Vinculum moderately narrow with a short saccus which terminates abruptly. Valvae gently angled after the basal third, the base is of the same width as the apex of the ventral process; the dorsal process is vermiform and curves downwards across the ventral process. Aedeagus strongly arched, the distal two-thirds of its length being very slender and tapering to a fine apex.

The ♀ of *augusta* differs slightly from the ♂ in the following ways. On the forewing upperside there is not as much brown scaling on the costa and the apical marking is more restricted, usually barely reaching vein 3 on the outer margin. On the forewing underside the space between the two black outer marginal lines is occupied by a yellowish line. On the hindwing underside, in addition to the fine black marginal line, there is a broader, brown submarginal line.

MATERIAL EXAMINED.

Neotype ♂, CAMEROUN: 'Bitje, Ja River, Cameroons, April-June 1910, Lesser rains (*G. L. Bates*)', dissection no. NHB. 1952-757, B.M. Type No. Rhop. 17269.

IVORY COAST: 1 ♂, Bingerville, 1915 (*G. Melou*). NIGERIA: 1 ♂, Oban, –.i.1921, D. Cator coll.; 1 ♂, Oban, –.ii.1921, D. Cator coll. CAMEROUN: 1 ♂, Mamfe, –.x.1956 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Mamfe, –.xi.1956 (*T. H. E. Jackson*); 1 ♀, Bitje, wet season, –.iv-v.1909, Adams bequest; 3 ♂, 2 ♀, Bitje, –.iv.-vi.1910, lesser rains (*G. L. Bates*); 2 ♂, Bitje, wet season, –.iv-v.1912 (*G. L. Bates*); 1 ♂, Bitje, dry season, –vi-vii.1909, Adams bequest; 1 ♂, Bitje, –.ix-xi.1911, Rothschild bequest; 1 ♂, Bitje, –.x & xi.1910 (*F. T. Vallins*); 1 ♀, Bitje, –.x-xi.1910, Rothschild bequest; 3 ♀, Bitje, 2000 ft, –.x & xi.1912, Joicey Bequest; 1 ♂, Bitje, 2000 ft., –.x. & xi.1912 (*F. T. Vallins*); 1 ♂, Bitje, wet season, 1913; 3 ♂, 1 ♀, Bitje, dry season, 1913, Joicey bequest; 1 ♂, 1 ♀, Bitje, 2000 ft, dry season (*G. L. Bates*); 1 ♂, 1 ♀, Bitje (*G. L. Bates*), Bethune-Baker coll.; 1 ♂, Lolodorf, 1894–5 (*L. Conradt*), ex Oberthür coll.; 1 ♀, Johann Albrecht's Hohe Station, 1896 (*L. Conradt*). UGANDA: 1 ♀, Mabira Forest, Kyagive, Mulange, 4000 ft (*R. A. Dummer*), Joicey bequest; 1 ♂, Mabira Forest, Chagwe, 3500–3800 ft, 16–25.vii.1911 (*S. A. Neave*).

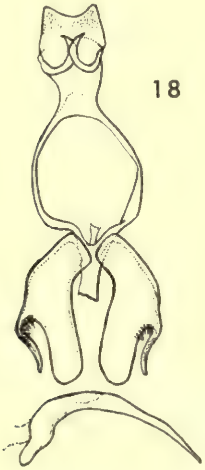
In the BMNH collection there are 1 ♂, 3 ♀, from Oban, S. Nigeria (Pl. 2, figs 39, 40). These specimens are much larger than *augusta* which they otherwise resemble more closely than any other known species. As the abdomen of the only male is missing it is considered inadvisable to name these insects until further material becomes available.

Liptena ilaro sp. n.

(Pl. 3, figs 42, 45; Text-fig. 19)

This species is difficult to separate from *augusta* by its external characters; examples of *augusta* from Mamfe are identical in facies to *ilaro*.

♂. *Upperside.* Ground colour pure white. On the forewing the costa is dark brown from the base to the apical patch and approximately 0·75 mm in breadth. In *augusta* the costal stripe is often much broader. The apical patch is not as extensive as that of *augusta* and terminates abruptly at vein 4 or a little beyond. A black marginal line extends as far



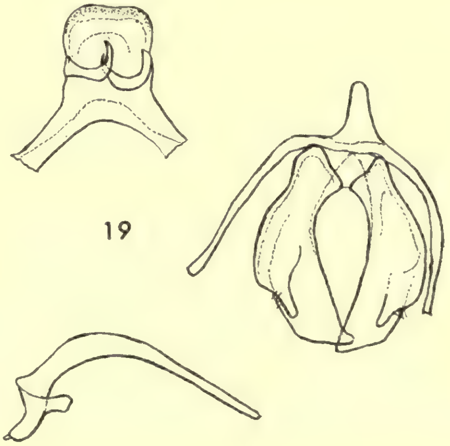


FIG. 18. *Liptena augusta* Suffert, ♂ genitalia.

FIG. 19. *Liptena ilaro* sp. n., ♂ genitalia.

as vein 3. In the examples examined the hindwing bears no markings; however, as this is a variable character in *augusta* it seems reasonable to assume that it may also be the case in this species. There is a greyish shadow visible around the outer margin of the hindwing, which is the underside marking showing through.

Underside. Hardly differs from that of *augusta*. On the forewing the base of the fringe is brown from the apex down to vein 4, then continues wholly white to the tornus. There is a dark brown marginal line which terminates between veins 2 and 3, and a lighter brown submarginal line extending to vein 4. In the 2 ♂ in the BMNH collection, the oblique subapical brown line commonly seen in *augusta* is not present. The hindwing bears a dark brown line which runs along the outer margin from vein 1b to vein 6. Fringes white.

Length of forewing: 15 mm. Legs, palpi and antennae as in *augusta*.

♂ *genitalia.* Differs markedly from that of *augusta* by the following characters: distal margin of the uncus regularly rounded with a slight depression in the middle, the lateral angles evenly rounded in contrast to *augusta* which has the distal margin concave and the lateral angles quite pronounced; the dorsal process of the valva is broader and heavier than in *augusta*, and the apex of the ventral process terminates obliquely instead of being rounded. Only the aedeagus is of the same shape – long and curved.

♀. Unknown.

MATERIAL EXAMINED.

Holotype ♂, NIGERIA: 'Ilaro, Lagos Dist., April 1955, (*T. H. E. Jackson*)', dissection no. NHB 1968–2763, B.M. Type No. Rhop. 17270.

Paratype ♂, as holotype, B.M. Type No. Rhop. 17271.

Liptena simplicia Möschler

(Pl. 3, figs 43, 46; Text-fig.20)

Liptena simplicia Möschler, 1887 : 63, fig. 14, ♀. 2 ♀ syntypes, GHANA: Aburi (depository unknown).

Larinopoda albula Druce, 1888 : 108. Holotype ♂, GHANA: Addah (*M. Burtt*) (BMNH, dissection no. NHB 1968–2708) [examined].

The ♂ type of *albula* Druce, which is synonymous with *simplicia* Möschler, is in the BMNH collection.

On the upperside the costa is broadly brown, the apical patch extending almost to vein 2 on the outer margin. On the underside of all wings a fine orange line runs adjacent to the base of the fringes. On the hindwing underside the brown band along the outer margin is approximately 3 mm wide. Females resemble the males but are slightly larger.

♂ *genitalia.* Uncus conical, narrow and bluntly pointed at apex. Subunci short, curved and slender. Tegumen oval. Vinculum narrow, with a parallel-sided saccus of medium length. Valvae wide in their middle part, the dorsal process short and finely pointed, the ventral process much longer and terminating in a comparatively massive excurved apex. Aedeagus long, weakly curved, the extremity dilated and bifurcate.

Recorded from Guinea, Sierra Leone, Liberia, Ghana and Nigeria.

The publication date for this species should be amended to 1887, not 1888 as stated by Aurivillius (1925 : 503).

MATERIAL EXAMINED.

♂ holotype of *Larinopoda albula* Druce, data given above.

GUINEA: 2 ♂, 1 ♀, Macenta, 2000 ft, 2–10, 19–21.v.1926 (*C. L. Collenette*). SIERRA LEONE: 1 ♂, Yonni, 12.iii.1903 (*T. H. E. Jackson*); 1 ♂, Yonni, 6.xii.1903 (*D. Cator*); 1 ♀, Yonni, 6.xii.1903, Joicey bequest; 1 ♂, Yonni, 1.i.1904, Joicey bequest; 1 ♂, Tani, 9.iv.1903, D. Cator coll.; 1 ♂, Tani, 24.v.1903, Adams bequest; 1 ♂, Tani, 14.vi.1903, ex Oberthür coll.; 1 ♂, Tani, 23.vi.1903, ex Oberthür coll.; 1 ♂, Tani, 24.6.1903, ex Oberthür coll.; 1 ♂, Poli, 10.vii.1903, ex Bethune-Baker coll.; 1 ♂, Baranga, 11.iv.1903, D. Cator coll.; 1 ♂, Baranga, 12.iv.1903, Joicey bequest; 1 ♂, 1 ♀, Baranga, 17.iv.1903, ex Oberthür coll.; 2 ♂, Baranga, 18.iv.1903, Adams bequest; 2 ♂, Baranga, 20.vi.1903, ex Oberthür coll.; 1 ♂, Baranga, 20.vi.1903, D. Cator coll.; 1 ♂, 1 ♀, Baranga, 19.vi.1903, ex Oberthür coll.; 1 ♀, Baranga, 17.xi.1903, Adams bequest; 1 ♂, Lunia, 20.iv.1903, D. Cator coll.; 1 ♂, Bandajuma, –.v–xi.1898, wet season (*G. I. Arnold*); 1 ♂, Fula Wusu, 12.i.1903, D. Cator coll.; 1 ♂, Fula Wusu, 17.iv.1903, D. Cator coll.; 1 ♂, Kholifa, 9.vi.1903, D. Cator coll.; 1 ♀, Kholifa, 11.vi. 1903, Adams bequest; 2 ♂, Kholifa, 8.vii.1903, Adams bequest; 1 ♂, 1 ♀, Kholifa, 9.vii.1903, Adams bequest; 1 ♂, Kholifa, 10.xii.1903, ex Bethune-Baker coll.; 1 ♂, Kholifa, 19.xii.1903, D. Cator coll.; 1 ♂, Sierra Leone, 15.iv.1903 (*D. Cator*); 1 ♂, 12.vii.1903, Adams bequest; 1 ♂, 2.xi.1903 (*D. Cator*); 1 ♀, 24.xii.1903 (*D. Cator*); 10 ♂, 3 ♀, various collections. LIBERIA: 1 ♂, 1 ♀, Kpaine, 1400 ft, 7°10′ N., 9°7′ W., 18.iii.1954 (*Dr W. Peters*); 1 ♀, Davoyi, 1600 ft, 7°34′ N., 8°44′ W., 14.i.1954 (*Dr W. Peters*); 1 ♂, 12 miles east of Monrovia, –.iii.1926 (*Portal Hyatt*); 3 ♀, 30 miles east of Monrovia, 200 ft, –.ii.1926, dry season (*M. Portal Hyatt*). GHANA: 1 ♂, 3 ♀, Ashanti, –.iii.1901 (*G. C. Dudgeon*); 2 ♀, Ashanti, –.i.1910 (*G. C. Dudgeon*); 2 ♂, Sunyani Forest, Kumasi, 1912, Joicey bequest; 1 ♂, Kumasi, 21.ii.1913 (*J. D. G. Saunders*); 1 ♂, Kumasi, 1913 (*Smeed*); 1 ♂, 1 ♀, Accra, Crowley bequest; 2 ♂, Accra,

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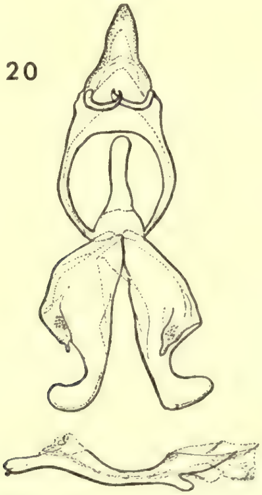

FIG. 20. *Liptena simplicia* Möschler, ♂ genitalia.

Rothschild bequest; 1 ♀, Volta River, Crowley bequest; 1 ♂, Odumase Swamp, 1913 (*Smeed*); 1 ♂, Agogo, 18.xii.1937 (*C. S. Cansdale*). NIGERIA: 2 ♂, 1 ♀, Obubra, Abakaliki Province, –.vii.1960; 1 ♂, Ilesha, Southern Nigeria, 1911 (*L. E. H. Humfrey*); 1 ♂, 3 ♀, Olokemeji, Ibadan, –.iv.1955 (*T. H. E. Jackson*); 1 ♂, Olokemeji, 1969 (*T. B. Larsen*).

***Liptena simplicia* f. *semilimbata* (Mabille) stat. n.**

(Pl. 3, figs 47, 50)

Lycaena semilimbata Mabille, 1890 : 24, pl. 2, fig. 3. Type ♂, IVORY COAST: Assinie [examined] (in BMNH).

Although *semilimbata* was formerly regarded as a synonym of *simplicia*, its characters are sufficiently distinct to make it easily distinguishable from the typical form of this species. Due to the present evidence it is treated here as a form, differing from the typical form in the extent of the dark markings. On the upperside the costa is brown at the base, with only a few scattered dark scales along its length. The apical patch is reduced and tapers to terminate at vein 4. On the hindwing underside the outer marginal band is only 1·5 mm broad in *semilimbata*, whereas in the typical form it measures from 2 to 3 mm. There are 3 ♂, 3 ♀, in the BMNH collection, all from Ivory Coast.

The male genitalia do not differ from those of typical *simplicia*.

MATERIAL EXAMINED.

IVORY COAST: 1 ♂, 'Assinie', 'L. semilimbata Mab.', 'ex musæo P. Mabille', appears to be part of Mabille's original series; 1 ♂, Bingerville, 1915 (*G. Melou*); 1 ♂, 3 ♀, 1919 (*Cremer*).

***Liptena bassae* Bethune-Baker**

(Pl. 3, figs 48, 51; Text-fig. 21)

Liptena subpunctata Bethune-Baker, 1906 : 340, ♂ ♀. ♂, ♀ types, NIGERIA: Kabba prov. 11.ix.1904 (BMNH) [examined]. [Nom. praeocc.]

Liptena bassae Bethune-Baker, 1926 : 390. [Replacement name for *Liptena subpunctata* Bethune-Baker.]

A series of 27 specimens in the BMNH, mostly from the Cator collection, are all from Nigeria. In the original description the wing expanse was quoted in error as 39 mm, but the type measures 32 mm, and other specimens in the series measure between 32 and 34 mm.

The larger size of this insect together with its dull white coloration and the form of the underside markings distinguish it from all other known species of *Liptena*. The forewings have rather pointed apices. A figure is given as this species has not previously been illustrated.

♂ *genitalia*. Uncus triangular. Subunci long and slender, evenly curved. Tegumen wide. Vinculum rather narrow with a pointed saccus. Valvae quadrangular, the dorsal process ending in a blunt point; the ventral process much longer and broader, with a rounded apex. Aedeagus very long and slender, evenly sinuate, and slightly dilated at its extremity.

MATERIAL EXAMINED.

NIGERIA: 1 ♂, Uro, Kabba Province, –.i.1915, D. Cator coll.; 1 ♂, Kpoinya, Kabba Prov., –.ii.1915, D. Cator coll.; 1 ♂, Olle, Kabba Prov., 4.v.1917, D. Cator coll.; 2 ♂, Olle, Kabba Prov., 14.vii.1915 (*T. H. E. Jackson*); 4 ♂, 1 ♀, Olle, Kabba Prov., 14.vii.1915, D. Cator coll.; 1 ♂, Olle, Kabba Prov., 21.ix.1916, D. Cator coll.; 3 ♂, Kabba Province, 25.viii.1905, D. Cator coll.; 1 ♀, Kabba Province, 25.viii.1905, Bethune-Baker coll.; 1 ♂, Kabba Province, 11.ix.1904, D. Cator coll.; 1 ♂, Kabba Province, 22.ix.1905, D. Cator coll.; 1 ♀, Bassa Province, N. Nigeria, 4.i.1905; 1 ♂, Bassa Prov., –.vi.1907, Bethune-Baker coll.; 1 ♂, Bassa Prov., –.xi.1906, D. Cator coll.; 1 ♀, Bassa Prov., –.xi.1906, Bethune-Baker coll.; 1 ♂, Bassa Prov., 23.xii.1904; 1 ♂, Bassa Prov., 25.xii.1904, D. Cator coll.; 1 ♂, Lagos (*G. Strachan*); 1 ♀, Ibadan, S. Nigeria, –.vi.1951 (*H. J. Sutton*); 1 ♂, Otan Ila, S. Nigeria, –.iv.1909 (*Dudgeon*); 1 ♂, Oyo, Ife, –.viii.1935 (*C. L. King*).

Liptena tiassale Stempffer

(Pl. 3, figs 49, 52: Text-fig. 22)

Liptena tiassale Stempffer, 1969 : 939, ♂ ♀. Holotype ♂, IVORY COAST: Tiassale (*B. K. Watulege*) (Stempffer coll.) [examined].

Described from Ivory Coast, this species does not appear to be closely related to any other white *Liptena*.

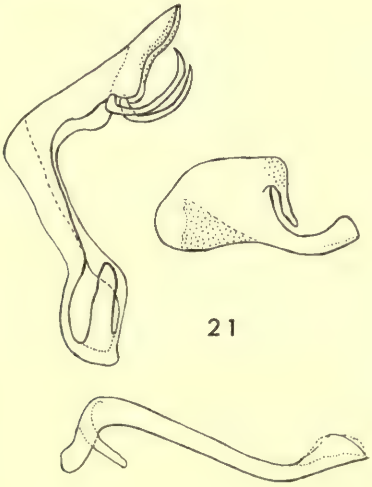

FIG. 21. *Liptena bassae* Bethune-Baker, ♂ genitalia.

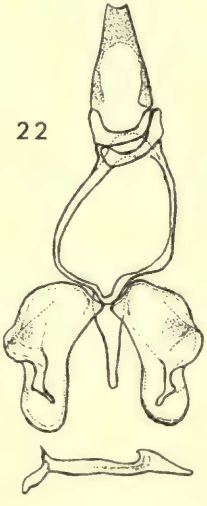

FIG. 22. *Liptena tiassale* Stempffer, ♂ genitalia.

In the ♂ the *upperside* is dull white; the forewing has a greyish brown costal band of approximately 2 mm width which does not invade the cell. The apical patch is small, not extending beyond vein 4 on the outer margin, and with a diffuse internal edge. On the hindwing are traces of a brown marginal line.

The *underside* is dull white also. The forewing with the costa finely yellow, this coloration continuing down the outer margin to vein 3 and bordered on either side by a fine brown line. A zig-zag line, interrupted at the veins, and an indistinct area of brown scaling complete the apical markings. Hindwing with a black marginal line and a rather weak, submarginal brown line.

Length of forewing: 17 mm. Legs greyish yellow.

♂ *genitalia.* Uncus trapezoidal with the distal margin slightly excised. Subunci robust, weakly curved with a swollen tip. Tegumen narrow, elongated. Vinculum slender with a saccus of medium length. Valvae rectangular, dorsal process with a strong projection at its tip, the extremity is folded across the ventral process which is very broad with a rounded apex. Aedeagus small and slender, dilated before the pointed tip.

♀. Resembles the ♂.

MATERIAL EXAMINED.

All from Ivory Coast, data as given in original description.

Liptena hapale Talbot

(Pl. 3, figs 53, 56; Text-fig. 23)

Liptena hapale Talbot, 1935 : 72, pl. 1, fig. 5, ♀. Holotype ♀, UGANDA: Budongo Forest, viii-ix.1934 (*T. H. E. Jackson*) (UM, Oxford) [examined].

Talbot's holotype being a female, a male neallotype is described hereunder.

♂. *Upperside.* Ground colour creamy white. The forewing has a large brown apical area which extends down the outer margin to just below vein 3, where it ends abruptly. The broadly brown costal band increases gradually in width from the base towards the apical patch and extends inward to the upper limit of the cell. The hindwing is immaculate. Fringes of all wings white except in the region of the apical patch on the forewing, where they are brown.

Underside. Ground colour creamy white with a yellowish cast, particularly in the apical area of the forewing. There are no markings. Fringes coloured as on upperside.

Length of forewing: 15·5 mm. Legs and palpi black; antennae black, flecked with white, the club black.

♂ *genitalia.* Uncus crescentic with a shallow depression at the distal margin. Subunci short, each with a long apophysis approximately midway along the lower border, and a short hook at the tip. Tegumen oval. Vinculum narrow with a short saccus. Valvae rectangular, the dorsal process long, the ventral process shorter, each having a blunt apex. Aedeagus slender, curved, and with an acute extremity.

In this species the male is smaller than the female.

MATERIAL EXAMINED.

♀ holotype, data given above.

UGANDA: ♂ neallotype, Katera Forest, Masaka, x-xi.1956 (*V. G. L. van Someren*), B.M. Type No. Rhop. 17275; 4 ♂, Katera Forest, Masaka, –.x-xi.1956 (*V. G. L.*

van Someren); 1 ♂, Katera, Sango Bay, Masaka, –.ii.1956 (*T. H. E. Jackson*); 3 ♂, 3 ♀, Entebbe, –.vii.1951 (*T. H. E. Jackson*); 1 ♂, Mpanga Forest, Mpigi, –.viii.1959 (*T. H. E. Jackson*); 1 ♂, Toro, –.iii.?.1940 (*T. H. E. Jackson*); 2 ♂, Budongo Forest (in Stempffer coll.).

Liptena decipiens (Kirby)

Teriomima decipiens Kirby, 1890 : 268.

This species ranges through Nigeria, Cameroun, Gabon and Congo (Brazzaville). The distinctive cream ground, the absence of any dark markings on the hindwing upperside, and the black legs, all distinguish it from other species of *Liptena*, except for *pearmani* which is similar in facies. The most positive character for the separation of these two species is the shape of the uncus of the male.

Liptena decipiens decipiens (Kirby)

(Pl. 3, figs 54, 57; Text-fig. 25)

Teriomima decipiens Kirby, 1890 : 268 ♂♀,. LECTOTYPE ♀, CAMEROUN: Barombi (*Preuss*) (BMNH), here designated [examined].

Thanks to the co-operation of Dr Hannemann of the MNHU, Berlin, we have been able to examine the entire material of *decipiens* belonging to that institution. Only one surviving specimen of the original series taken by Preuss has been discovered; regrettably this specimen is a female and is now designated as a lectotype.

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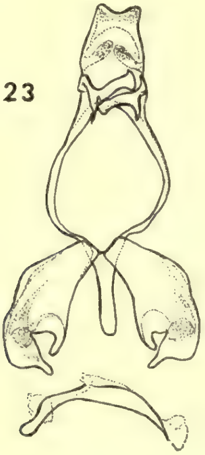

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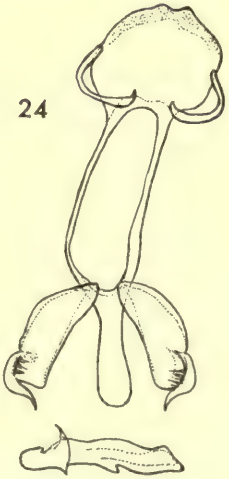


FIG. 23. *Liptena hapale* Talbot, ♂ genitalia.

FIG. 24. *Liptena inframacula* Hawker-Smith, ♂ genitalia.

♀. *Upperside.* Ground colour creamy white. Forewing with the costa very narrowly brown, broadening into an apical area of moderate size. Hindwing without markings.

Underside. Ground colour slightly more yellow than that of the upperside. In the apical region of the forewing are two indistinct submarginal lines which are little more than an intensification of the ground colour. The extent and intensity of colour of these lines is a variable characteristic. There is a dark brown marginal line on the upper two-thirds of the forewing and the fringes in this area are also brown; remainder of fringes as ground colour.

Length of forewing: 15 mm. Legs and palpi black; antennae black, flecked with white beneath, the club black with an orange tip.

♂ *genitalia.* Uncus trapezoidal, subunci slender, of uniform width and terminating in a short point. Vinculum narrow, saccus large and spatulate. Valvae rectangular with a triangular apex. Aedeagus short, parallel-sided, curved distally and with a dorso-ventral cleft.

The specimens in the BMNH collection are from North Cameroun and various localities in Nigeria.

MATERIAL EXAMINED.

Lectotype ♀, CAMEROUN: 'Kamerun, Barombi-Stat., Preuss S.', 'Paratypus'.

NIGERIA: 1 ♂, Bassa Province, N. Nigeria, 27.i.1905, T. H. E. Jackson coll.; 1 ♂, Bassa Prov., 2.ii.1905, Bethune-Baker coll.; 1 ♂, Mamu Awka, Onitsha Province, –.vi.1959, T. H. E. Jackson coll.; 1 ♂, Ndebeje, Calabar Province, –.ix.1958, T. H. E. Jackson coll.; 1 ♀, Omuo, Kabba Province, N. Nigeria, 29.iv.1914, D. Cator coll.; 1 ♀, Ubiaja, Benin Province, –.vi.1955 (*T. H. E. Jackson*); 2 ♀, Ilaro, Lagos District, –.iv.1955 (*T. H. E. Jackson*); 1 ♀, Oban, –.v.1920, D. Cator coll.; 1 ♂, S. Nigeria, –.ii.1921, D. Cator coll. CAMEROUN: 25 ♂, 4 ♀, Johann Albrecht's Hohe Station, 1896 (*L. Conradt*); 1 ♀, Mamfe, –.xi.1956 (*T. H. E. Jackson*); 1 ♂, Johann Albrecht's Hohe Station, 1898 (*L. Conradt*).

Liptena decipiens leucostola (Holland) **stat. n.**

(Pl. 3, figs 55, 58; Text-fig. 26)

Teriomima leucostola Holland, 1890 : 429, ♂. 4 syntypes, sex unknown, GABON: Kangwe, upper R. Ogove (*A. C. Good*) (CM, Pittsburgh) [examined].

Liptena citronensis Bethune-Baker, 1926 : 389, ♀. Holotype ♀, CAMEROUN: Bitje, Ja River, wet season, iv.1909 (BMNH) [examined]. **Syn. n.**

Liptena decipiens cameroona Bethune-Baker, 1926 : 389, ♂♀. Holotype ♂, CAMEROUN: Bitje, Ja River, 2000 ft, xi.1909 (BMNH, dissection no. NHB 1968–2693) [examined]. **Syn. n.**

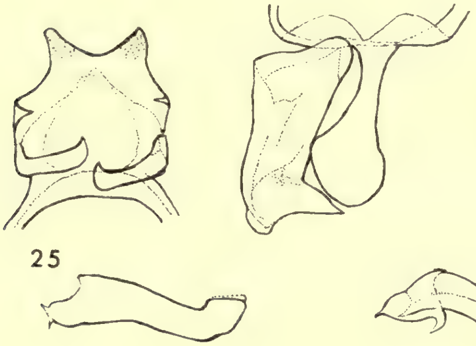
Recorded from South Cameroun and Gabon.

It differs from the nominate subspecies in having the brown costal band broader throughout its length, the dark apical patch more extensive and the outer marginal part much broader than in *d. decipiens*. The underside is noticeably more yellow.

♂ *genitalia.* The subunci differ from those of *d. decipiens* by being appreciably broader; otherwise the genitalia do not differ.

MATERIAL EXAMINED.

♀ holotype of *citronensis*. ♂ holotype, ♀ allotype of *cameroona*. Data given above. CAMEROUN: 1 ♀, Chang, 4700 ft, –.viii.1922 (*G. L. Bates*); the following specimens all from Bitje, Ja River: 1 ♂, –.iv.v.1909, wet season, Adams bequest; 1 ♂, –.iv.1912, (*G. L. Bates*); 2 ♂, 1 ♀, –.iv.– (*G. L. Bates*); 3 ♂, –.iv-vi.1910, lesser rains (*G. L. Bates*); 3 ♂, 1 ♀, –.iv-v.1912, wet season (*G. L. Bates*); 2 ♂, 1 ♀, early May and June, wet season; 2 ♂, –.vi-vii.1909, dry season, Adams bequest; 1 ♂, –.vi-vii.1909, dry season; 3 ♂, 1 ♀, dry season (*G. L. Bates*); 1 ♀, dry season, 1913; 1 ♀, –.ix-x-xi.1912 (*F. T. Vallins*); 2 ♂, 1 ♀, –.ix-x-xi.1911, Rothschild bequest; 2 ♂, 3 ♀, –.ix.1908, Adams bequest; 2 ♀, –.ix-x.1907, Adams bequest; 1 ♂, wet season, –.x.1909, Adams bequest; 3 ♂, –.x-xi.1913, wet season; 1 ♀, wet season, 1926 (*G. L. Bates*); 1 ♀, –.xi.1909; 3 ♂, –.x & xi.1910; 3 ♂, 1 ♀, –.x-xi.1912; 1 ♂, wet season (*G. L. Bates*); 3 ♂, wet season, 1913; 6 ♂, 7 ♀, Bitje, little other data. GABON: 4 ♂, Lake Asebbe, Fernan-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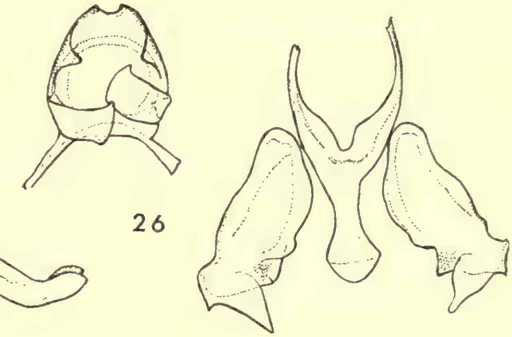
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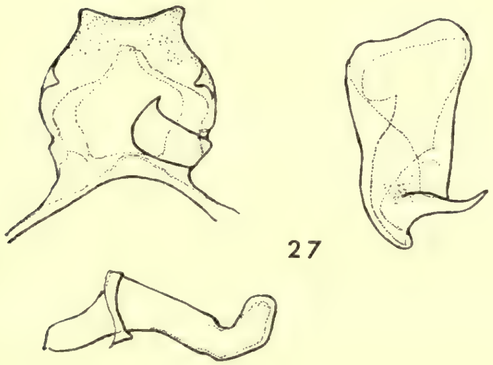
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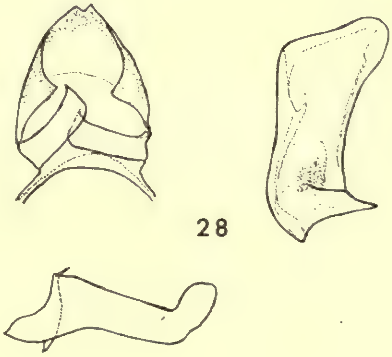
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FIG. 25. *Liptena decipiens decipiens* (Kirby), ♂ genitalia.

FIG. 26. *Liptena decipiens leucostola* (Holland), ♂ genitalia.

FIG. 27. *Liptena decipiens etoumbi* subsp. n., ♂ genitalia.

FIG. 28. *Liptena pearmani* sp. n., ♂ genitalia.

Vaz, –.i.1908 (*Dr Ansorge*); 2 ♂, Ogowe, Godman & Salvin coll.; 1 ♂, 1 ♀, Ogowe, Joicey bequest; 1 ♂, 1 ♀, Ogowe, ex Bethune-Baker coll.; 6 ♂, 3 ♀, Gabon, from various collections. CONGO (BRAZZAVILLE): 1 ♀, Etoumbi, –.xi.1958 (*T. H. E. Jackson*).

Liptena decipiens etoumbi **subsp. n.**

(Pl. 3, figs 59, 60; Text-fig. 27)

This subspecies is similar to *d.* ***leucostola*** but the characters are more extreme; the brown apical patch is darker and more extensive, extending down the outer margin as far as vein 2, and covering almost one-half of the forewing. The costa is brown for its entire length. On the underside there is a brown line at the base of the fringes in the apical region, where they are brown and yellow chequered. There is a pair of dull yellow outer marginal lines and an oblique line, of the same hue, from vein 4 to the costa. The pair of dull yellow lines is continued along the outer margin of the hindwing. All material in the BMNH collection is from Congo (Brazzaville). The sexes do not differ externally. Length of forewing: ♂ 14 mm, ♀ 14·5 mm. Legs, palpi and antennae as in typical *decipiens*.

♂ *genitalia*. Similar to *d. leucostola*, the genitalia show broad, short subunci but can be distinguished from *d. leucostola* by the form of the apex of the valva, which is long, narrow and whip-like, not broadly triangular as in both *d. leucostola* and *d. decipiens*.

MATERIAL EXAMINED.

Holotype ♂, CONGO (BRAZZAVILLE): 'Etoumbi, Moyen Congo, Fr. Equat. Afr., –.i.1959 (*T. H. E. Jackson*)', dissection no. NHB. 1968–2694, B.M. Type No. Rhop. 17277.

Paratypes. CONGO (BRAZZAVILLE): allotype ♀, Mambili Forest, Ouesso, –.viii.1959 (*T. H. E. Jackson*), B.M. Type No. Rhop. 17278; 1 ♂, 1 ♀, as holotype; 5 ♂, as holotype, various dates; 1 ♂, as allotype.

Liptena pearmani **sp. n.**

(Pl. 4, figs 61, 64; Text-fig. 28)

This insect is dedicated to the late J. V. Pearman, the celebrated Psocopterist, who was a much esteemed colleague at Tring for many years.

This species has in the past been confused with *decipiens*, to which it is most closely related, but the ♂ armature is quite distinct. It is recorded from Nigeria and Ghana.

♂. *Upperside*. Ground colour creamy white. Forewing with the base of the costa fuscous. The apical patch is smaller than that of *d. decipiens*, barely reaching vein 3 on the outer margin and with an evenly curved inner edge.

Underside. Ground colour more yellow than that of the upperside, there is a pair of yellowish lines along the outer margin of all wings: they are broader in the apical region of the forewing. Fringes brown in the region of the apical patch, otherwise cream.

Length of forewing: 15 mm. Legs, palpi and antennae as in *decipiens*.

♂ *genitalia*. Of the twelve examples that have been dissected, all exhibit a triangular uncus, as opposed to the trapezoidal uncus of *decipiens*. The subunci are long and of medium breadth with a tapered base. The valvae and aedeagus are similar to those of *decipiens*.

♀. Apparently indistinguishable from *decipiens*.

MATERIAL EXAMINED.

Holotype ♂, NIGERIA: 'Ubiaja, Benin Prov., –.vii.1955 (*T. H. E. Jackson*)', dissection no. SJM. 1969–80, B.M. Type No. Rhop. 17279.

Paratypes. NIGERIA: 1 ♂, as holotype, –.vi.1950; 1 ♂, as holotype, –.vi.1955; 1 ♂, as holotype, –.vii.1956; 2 ♂, as holotype, –.viii.1955; 1 ♂, Ubiaja, Benin Province (*T. H. E. Jackson*); 1 ♂, Omuo, Kabba Province, N. Nigeria, 29.x.1916, Cator coll.; 1 ♂, ditto, 29.iv.1914; 1 ♂, Ilaro, Lagos district, –.iv.1955 (*T. H. E. Jackson*). GHANA: 1 ♂, Ho.; 1 ♂, Anfoega; 1 ♂, Kpandu (these 3 ♂ from Ghana in Stempffer coll.).

Liptena inframacula Hawker-Smith

(Pl. 4, figs 62, 65; Text-fig. 24)

Liptena inframacula Hawker-Smith, 1933 : 7, ♂. Holotype ♂, CAMEROUN: Bitje, Ja River, 2000 ft, 4.v.1912 (*G. L. Bates*) (BMNH) [examined].

This species is known from Cameroun and Congo (Brazzaville) but very few specimens have been collected. A female neallotype is described hereunder.

♀. *Upperside.* Ground colour creamy white. Forewing with the costa sooty and an angled apical patch extending down the outer margin as far as vein 4. Hindwing without markings but sufficiently translucent to show the markings of the underside.

Underside. Ground colour creamy white, the forewing slightly tinged with yellowish at the base; markings greyish brown. There is a small brown mark on the discoidal vein of the forewing, and immediately above this a brown costal mark; a further mark is situated on the costa equidistant between the end of the cell and the base of the forewing. An interrupted submarginal line extends from the costa to vein 4. A very fine, brown, marginal line, internally edged with yellow, runs along the outer margin of all wings. On the hindwing an interrupted submarginal line runs from the fore margin of the wing to the anal angle. There are a number of brown spots: one in the cell, a subcostal spot below vein 8, another between veins 6 and 7, one between veins 4 and 5, and a smaller one between veins 2 and 3.

Length of forewing: 15 mm. Legs and palpi orange; antennae black, flecked with white, the club black.

♂ *genitalia.* Uncus crescentic, narrow, very slightly excised at the distal margin. Tegumen rounded, unusually wide. Subunci slender, curved. Vinculum narrow with a fairly large, rounded saccus. Valvae of small size, the dorsal process ending in a curved point, the ventral process shorter with a rounded apex. Aedeagus nearly straight with a strong tooth on the ventral surface and an obliquely cut extremity.

The two males from Kelle, and the male from Bitje in the BMNH collection, are all more heavily marked than Hawker-Smith's type male from Bitje. The forewing length of the type and of the three males is 15 mm.

MATERIAL EXAMINED.

♂ holotype, data given above.

CONGO (BRAZZAVILLE): ♀ neallotype, 'Kelle, Moyen Congo', x. 1963 (*T. H. E. Jackson*), B.M. Type No. Rhop. 17280; 1 ♂, Kelle, iv. 1963 (*T. H. E. Jackson*); 1 ♂, Kelle, x. 1963 (*T. H. E. Jackson*). CAMEROUN: 1 ♂, Bitje, Ja River, 1915, Joicey bequest.

Liptena undularis Hewitson

(Pl. 4, figs 67, 69; Text-fig. 29)

Liptena undularis Hewitson, 1866 : 120, pl. 60, fig. 7, ♀. Holotype ♀, 'CONGO' (BMNH) [examined].

This species occurs in Cameroun, Gabon, Congo (Brazzaville), Zaire, Uganda and Angola. The size and shape of the apical patch varies according to locality. As Hewitson's type was a female, a male neallotype is now described.

♂. *Upperside*. Ground colour white. Forewing with the base of the costa dusted with brown scales. The apical marking is not the usual form of a patch with a concave internal edge; it has a triangular incision of the ground colour which produces an angled effect at the apex. The width of the marking along the costa and down the outer margin varies between 3 and 4 mm. The apical marking is dark brown and extends from the distal third of the costa down the outer margin almost to vein 4. There are some small 'bare' areas within the apical patch where the ground colour is exposed. Fringes white, black at the periphery of the patch. The hindwing is without markings but the underside markings are visible through the wing. Fringes of the hindwing yellowish, black at the end of the veins.

Underside. All markings on the underside are rufous brown except where otherwise stated. Forewing white, except in the region of the markings where it is yellowish white. Black fringes correspond to the extent of the apical patch of the upperside; basad to these is an extremely fine band of dull yellow edged internally by a series of four brown linear markings which extend to vein 4. A thicker zig-zag band runs downwards from the costa to vein 4 and some vague brownish patches mark the inner extent of the apical patch of the upperside forewing. A short band from the costa runs posteriorly and obliquely to beyond the limit of the cell and ends at vein 4. Small spots are present inside the cell of some examples. The hindwing is yellowish white with dull yellow fringes except at the vein endings, where they are dark brown. There is an extremely fine marginal line. A zig-zag line runs from the fore margin of the hindwing to the anal fold. Another line, similar in form but not as distinct, is situated basad to that, and then a much heavier straight line, interrupted at the veins, traverses the median area of the wing. Between veins 6 and 7 is a patch shaped like an arrow-head which is positioned equidistant between the two latter lines and is inwardly directed. The base of the wing is crossed by several linear markings.

Length of forewing: 20 mm. Legs black, ringed with orange; palpi black; antennae black, flecked with white beneath.

♂ *genitalia*. Uncus crescentic with a slight depression in the distal margin; subunci evenly curved, ending in a point. Tegumen oval. Vinculum of moderate width with a long, spatulate saccus. Valvae rectangular, the long dorsal process ending in a small hook, the ventral process is shorter and terminates in a blunt point. Aedeagus long, cylindrical, and weakly curved.

MATERIAL EXAMINED.

♀ holotype, data given above.

ZAIRE: ♂ neallotype, Albertville, L. Tanganyika 770 m, i. 1922 (very dry) (*T. A. Barns*), B.M. Type No. Rhop. 17281; 1 ♂, Funa to Kinshasa, 1924 (*Major Briggs*); 3 ♂, 2 ♀, Katanga, Joicey bequest; 1 ♂, Kunzulu Estate, dry season, 1919; 1 ♀, Lutesi, nr Leopoldville, 1913 (*S. F. Faber*); 2 ♂, 1 ♀, no further data; 5 ♂, 1 ♀, Albertville, Lake Tanganyika, vi. 1919 (*T. A. Barns*). CAMEROUN: 2 ♂, 1 ♀, Bitje, Ja River, 2000 ft, –.iv-v.1910, lesser rains (*G. L. Bates*); 2 ♂, 1 ♀, Bitje, 4.v.1912 (*G. L. Bates*); 1 ♂, as preceding specimen, Adams bequest; 1 ♂, 5 ♀, Bitje, early May and June, wet season, Joicey bequest; 1 ♀, Bitje, –.ix.1908, Adams bequest; 1 ♂, 1 ♀ Bitje, –.ix-x-xi.1911 (*F. T. Vallins*); 2 ♀, ditto, Rothschild bequest; 3 ♂, Bitje, –.x.1908, Adams bequest; 1 ♀, Bitje, –.ix-x.1907, Adams bequest; 2 ♂, 1 ♀, Bitje, –.x & xi. 1910, Rothschild bequest; 2 ♂, 1 ♀, Bitje, –.x-xi.1913, wet season, Joicey bequest; 1 ♂, Bitje, –.xi.1909, ex coll. Bethune-Baker; 2 ♂, Bitje, 3°N., 12°E., wet season, 1926 (*G. L. Bates*); 9 ♂, 10 ♀, Bitje, little other data. GABON: 1 ♂, Abanga, –.x.1907 (*Dr Ansorge*); 1 ♀, Lake Azingo, –.xii.1907 (*Dr Ansorge*); 1 ♀, Ogowe River, Rothschild bequest; 6 ♂, 4 ♀, insufficient data. CONGO (BRAZZAVILLE): 1 ♂, 10.xi.1940 (*V. M. Muspratt*); 4 ♂, Etoumbi Forest, 14.xii.1958 (*T. H. E. Jackson*); 3 ♂, Etoumbi, –.xii.1958 (*T. H. E. Jackson*); 6 ♂, Etoumbi, –.xi.1958 (*T. H. E. Jackson*); 1 ♂, Bopoto, upper Congo (*Rev. K. Smith*); 2 ♂,, Bopoto (*Balfern*), Rothschild bequest. ANGOLA: 1 ♀, Landana, 1883 (*L. Petit*), ex Oberthür coll.; 2 ♂, Lukia River, –.iv.1899 (*Penrice*); 1 ♂, Gulungo Alto, 12.i.1904 (*Dr Ansorge*); 1 ♀, N'Dalla Tando, northern Angola, 2700 ft, 5.i.1909 (*Dr W. J. Ansorge*); 1 ♀, as above, 9.i.1909; 1 ♀, ditto 20.ii.1908; 1 ♀, ditto, 20.ix.1908; 1 ♀, ditto, 23.xi.1908; 1 ♂, ditto, 25.xi.1908; 1 ♂, ditto, 28.xi.1908; 3 ♀, ditto, –.xii.1908; 1 ♂, ditto, 4.xii.1908; 2 ♂, 1 ♀, Cassualalla, northern Angola, 27.vi.1908 (*Dr W. J. Ansorge*); 1 ♂, 1 ♀, as above, 28.vi.1908; 2 ♂, ditto, 30.vi.1908; 1 ♂, ditto, 10.vii.1908; 1 ♂, Loanda, 8.ii.1875 (*A. V. Homeyer*); 2 ♂, Loanda, ex Grose-Smith coll.; 1 ♂, 1 ♀, Prov. Malange, Rio Cuanza, 29.iii.1937; 1 ♂, Pungo Andongo, 12.iv.1875, (*A. V. Homeyer*); 1 ♂, 1 ♀, Pungo Andongo, –.vii.1875 (*A. V. Homeyer*); 1 ♀, Pungo Andongo (*Welwitsch*), Felder coll.; 1 ♂, Benguella to Caconda, –.v.1897 (*Penrice*); 1 ♂, Dondo, 6.v.1875 (*A. V. Homeyer*); 2 ♂, 1 ♀, Dondo, ex Suffert coll.; 2 ♂, 1 ♀, Barraca, Cuanza River, 30.v.1901 (*H. Pemberton*); 1 ♂, as above, 14.vi.1901; 1 ♂, Kinsembo, 1.viii.–; 3 ♂, Kinsembo, no other data; 1 ♀, Staz. Bauri, –.ix.1883; 5 ♂, Marimba, 30.ix.1903 (*Dr Ansorge*); 1 ♂, 1 ♀, Bange Ngola, 5.x.1903 (*Dr Ansorge*); 1 ♀, as above, 4.x.1903; 2 ♂, Canhoca, 16.xi.1903 (*Dr Ansorge*); 1 ♂, Bolombo River (*Penrice*), also bearing a note 'rains in 2nd, 3rd, 4th, 9th & 12th months & little rain from E. 8–10th month.'; 5 ♂, 1 ♀, Angola, little other data. Specimens from Gabon & Uganda in Stempffer collection.

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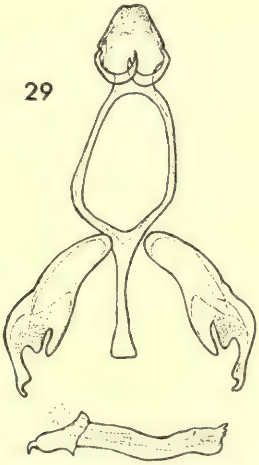


FIG. 29. *Liptena undularis* Hewitson, ♂ genitalia.

Liptena ferrymani (Grose-Smith & Kirby)

Pentila ferrymani Grose-Smith & Kirby, 1891 : 50, pl. 12, figs 11, 12.

The extent and shape of the brown arc from the costal base on the forewing upperside are characteristic of this species. Recorded from Ivory Coast, Nigeria, Cameroun and Sudan.

Liptena ferrymani ferrymani (Grose-Smith & Kirby)

(Pl. 4, figs 68, 70; Text-fig. 30)

Pentila ferrymani Grose-Smith & Kirby, 1891 : 50, pl. 12, figs 11, 12, ♂. Holotype ♂, NIGERIA: Lokoja (*Ferryman*) (BMNH) [examined].

Recorded from Nigeria, Cameroun, and Bahr-el-Ghazal, Sudan. Specimens from the eastern confines of the range appear to differ from typical *ferrymani*, but we have insufficient material upon which to base a further subspecies. The three females in the BMNH collection have the brown arc from the costal base very broad, covering rather more than half of the cell; the distal end of the arc retains its width, instead of tapering off as it does in the nominate subspecies. The spacing of the transverse bars of the underside also differs from those of normal specimens of *ferrymani*.

The male holotype of *ferrymani* is in the BMNH collection; the locality given is 'Lokaja' and is probably a mis-spelling or alternative spelling of Lokoja, which is in Nigeria. The female has not previously been described.

♀. *Upperside*. Ground colour white with a fuscous suffusion at the base of all wings. Forewing with the brown arc from the base of the costa approximately 2 mm in width – not quite as broad as in the type; the marking extends beyond the cell between veins 5 and 6. The brown apical marking extends down the outer margin as far as vein 2, where it terminates as a fine line. Hindwing with the seven bars of the underside visible through the wing. The outer margin bears a brown marginal line. The fringes of all wings white, except in the apical area where they are brown.

Underside. Ground colour of forewing white, the area corresponding to the brown arc of the upperside is a mixture of fuscous and dirty white. The apical marking also appears to have a dirty white ground due to the density of brown scaling of the upperside. Fringes of the apical marking yellowish with fuscous tips, a brown marginal line as far as midway between veins 2 and 3. Basad to this is a broader submarginal line, interrupted by the veins and extending downwards as far as vein 4. Across the inner limit of the apical marking is a broad irregular brown band. Hindwing ground colour cream. The wing is marked by seven narrow brown bars. The two basal bars are straight; the third only traverses the lower half of the wing, ending at the origin of vein 7; the fourth and fifth run from the costa to the anal fold and are slightly irregular; the sixth is scalloped and ends at vein 6; the seventh is complete and is more markedly scalloped; distad to this is a darker marginal line. The fringes of the underside are white, except in the region of the apical marking of the forewing where they are fuscous.

Length of forewing: 19 mm, expanse 38 mm. Legs dull orange with brown scaling; palpi white, faced internally, and tipped, with black; antennae black, white-flecked.

♂ *genitalia*. Uncus conical with a slight depression in the distal margin. Tegumen oval. Subunci curved, bulbous at the tip and with a sharply pointed hook. Vinculum narrow with a long, broad, evenly rounded saccus. Valvae triangular, the dorsal process broad at base and tapering to a slender, slightly curved apex, the ventral process smaller, also with a broad base. Aedeagus moderately slender narrowing to a truncate apex.

MATERIAL EXAMINED.

♂ holotype, data given above.

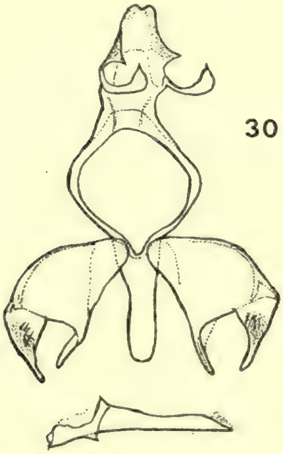
NIGERIA: ♀ neallotype, Lagos, 1900 (*Dr Strauchan*), B.M. Type No. Rhop. 17282; 1 ♂, Kadura River Gardens, –.vii-viii.1967 (*Stuart Norman*), 'flying among citrus bushes, mango trees & long grasses immediately after rain'; 1 ♂, Kadura, northern Nigeria, –.viii–ix.1951 (*R. W. Pring*); 1 ♂ Kadura,–.x.1951; 4 ♂, Nassarawa, northern Nigeria, i.vi.1911, D. Cator coll.; 2 ♂, Lagos, 1906 (*Dr Strauchan*). CAMEROUN: 4 ♂, Buar, 10–25.v.1914; 1 ♂, Babua Bondaye, 6.v.1914. SUDAN: 3 ♀, Tambura, Bahr-el-Ghazal.

Liptena ferrymani bigoti Stempffer

(Text-fig. 31)

Liptena ferrymani bigoti Stempffer, 1964 : 1233, ♂. Holotype ♂, IVORY COAST: Nion, 3.v.1962 (*L. Bigot*) (MNHN, Paris) [examined].

This race occurs in the Ivory Coast. There are no examples in the BMNH collection. The holotype is in the MNHN, Paris. It differs from *f. ferrymani* in the absence of the white spot in the dark apical patch on the upperside, and in the enlargement between veins 2 and 3, of the lowermost portion of the apical patch. This enlarged portion is also present on the underside, whereas in *f. ferrymani* it does not exist on the underside. The transverse lines of the underside hindwing of *f. bigoti* are finer and brighter, and of these the fourth, fifth and sixth are all irregular. The nervures are not brown.



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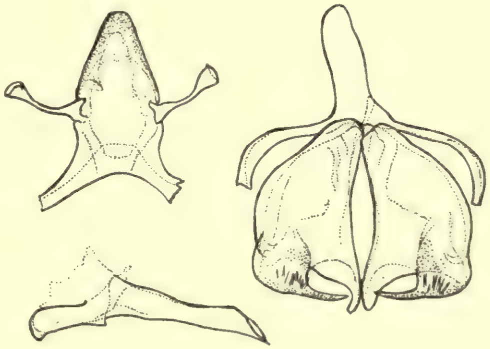

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FIG. 30. *Liptena ferrymani ferrymani* (Grose-Smith & Kirby), ♂ genitalia.

FIG. 31. *Liptena ferrymani bigoti* Stempffer, ♂ genitalia.

The male genitalia illustrated by Stempffer (1967 : 49, fig. 40) under *f. ferrymani* are, in fact, those of *L. f. bigoti*. At the time when the figure was drawn Stempffer thought it to be *f. ferrymani* as no other specimen was available to him; later, when he examined a true example of the typical race he discovered that the male genitalia differed and that the original genitalia drawing was not that of *f. ferrymani*, as he had previously thought, but was in fact that of a new subspecies of *ferrymani*, and this he later named *bigoti*.

♂ *genitalia*. Differ from those of the typical race in that the conical uncus shows no sign of a depression at the apex. Subunci differ in being narrow in their central part and not as curved as those of *f. ferrymani*. Valvae with dorsal and ventral processes broader and shorter.

Liptena septistrigata (Bethune-Baker)

(Pl. 4, figs 63, 66; Text-fig. 32)

Pentila septistrigata Bethune-Baker, 1903 : 325, '♂'. Holotype ♀ (not ♂ as stated by Bethune-Baker), SIERRA LEONE: Moyamba, 15.vi.1902 (BMNH, dissection no. SJM 1970–129) [examined].

This species is represented in the BMNH collection by specimens from Sierra Leone, Ivory Coast, Ghana and Nigeria. As Bethune-Baker's 'male' type is actually a female, a male neallotype is described below.

♂. *Upperside*. Ground colour white. Forewing with a dusting of dusky scales at the base. The broad, brown costal band encroaches upon the upper limit of the cell; beyond the cell the brown coloration broadens and intensifies into the apical patch. The patch is approximately 4 mm wide down the outer margin as far as vein 4, where it narrows sharply, terminating between veins 3 and 4. A very fine, brown marginal line runs from the apex to midway between veins 2 and 3. Hindwing white with the bars of the underside showing through the wing. There is a brown marginal line running from the anal angle to vein 3; parallel to this the fringes bear some fuscous linear marks. Fringes brown in the region of the apical patch of the forewing, white elsewhere.

Underside. Ground colour white. On the forewing there is a brown streak along the upper limit of the cell and the area anterior to this is dull yellowish with some brown scaling. From the centre of the costa a brown line, 4·5 mm long, arises and runs obliquely outwards just above the upper angle of the cell. The apical area appears dirty white due to the intensity of the upperside dark marking showing through the wing. A very fine brown marginal line runs from the apex down to midway between veins 2 and 3. A less fine, brown, submarginal line, interrupted at the veins, extends downwards to vein 3. Between these two lines the coloration of the wing is clear yellow, extending beyond the brown marginal line, down to vein 2. Basad to these is a brown scalloped line down to vein 4. In each cell space between veins 8 and 9, and 9 and 10, there is a single linear mark. A broader irregular brown line at the inner limit of the apical area does not follow the contour of the upperside apical patch as does that of *ferrymani*, but runs from the costa in an uneven curve, keeping within the contour of the upperside marking, and terminating at vein 4. Seven transverse stripes and a marginal line mark the white ground of the hindwing. Stripes 1 and 2 are straight and complete; stripe 3 is abbreviated running from the anal fold to the origin of vein 7; the fourth and fifth are complete; the sixth is similar to the fifth and at vein 6 it coalesces with the seventh stripe, which is narrower and more clearly defined and follows the contour of the outer margin. There is a fine submarginal brown line bordered outwardly by a yellowish band corresponding to the forewing markings. Distad to this is a marginal line, entire in the lower part of the wing, but broken into short dashes anteriorly. Fringes of the underside white except in the apical area of the forewing where they are pale brown.

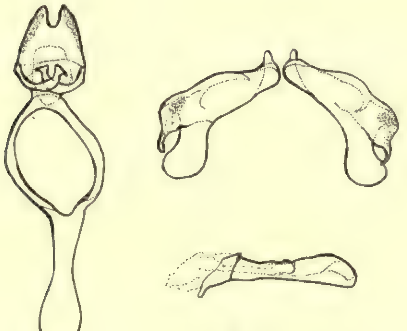
Length of forewing: 16 mm, expanse 33 mm. Legs orange, with some scattered brown scales, especially on the femur; palpi orange with some brown scaling; antennae black, with white scaling on the ventral and lateral surfaces, the club tipped with orange.

♂ *genitalia*. Uncus crescentic, deeply excised at the distal margin. Subunci curved, slightly swollen in the middle, with a strong hook at the tip. Tegumen narrow at base. Vinculum oval with a long spatulate saccus. Valvae rectangular, the dorsal process ending in a strong hook, the ventral process longer with a wide rounded apex. Aedeagus rather short, dilated before the rounded extremity.

MATERIAL EXAMINED.

♀ holotype.

SIERRA LEONE: ♂ neallotype, Mabang, 30.xii.1903, D. Cator coll., B.M. Type No. Rhop. 17283; 1 ♂, Tabi, 24.iv.1903, D. Cator coll.; 3 ♂, Mabang, 27.xii.1903 (*D. Cator*); 1 ♂, Mabang, 30.xii.1903, Adams bequest; 1 ♀, Panguma, –.i.1908 (*G. C. Dudgeon*); the following specimens from Moyamba: 1 ♂, 4.i.1904, Adams bequest; 1 ♂, 5.i.1904, Adams bequest; 3 ♂, 5.i.1904; 1 ♂, 11.i.1904 (*T. H. E. Jackson*); 1 ♂, 2 ♀, 21.ii.1903 (*T. H. E. Jackson*); 1 ♀, 11.i.1904, Adams bequest; 1 ♂, 2 ♀, 21.ii.1903, Adams bequest; 1 ♀, 21.ii.1903, ex coll. Bethune-Baker; 1 ♂, 24.ii.1902 (*D. Cator*); 2 ♂, 1 ♀, 17.iii.1903; 2 ♂, 15.iii.1903, Rothschild bequest; 1 ♀, 24.iv.1902, Adams bequest; 1 ♂, 2.v.1902 (*T. H. E. Jackson*); 1 ♂, 20.x.1903; 1 ♀, 31.x.1903 (*T. H. E. Jackson*); 7 ♂, 5 ♀, insufficient data. IVORY COAST: 1 ♂, Deimba, 17.ii.1903 (*Pemberton*); 1 ♀, Bingerville, 14–20.vi.1915 (*G. Melou*); 1 ♂, 1 ♀, Sunyani, Coomassie, 1913, Joicey bequest. NIGERIA: 1 ♂, 1 ♀, Bassa Prov., northern Nigeria, 23.xii.1904, D. Cator coll.; 1 ♂, Eket, southern Nigeria, 20.viii.1920, D. Cator coll.; 1 ♂, Obubra, Abakaliki Province, –.vii.1960 (*T. H. E. Jackson*); 1 ♀, Ilesha, southern Nigeria (*Capt. Humfrey*); 1 ♀, Ogruga, Adams bequest. ZAIRE: 1 ♂, Funa (*F. T. Vallins*).



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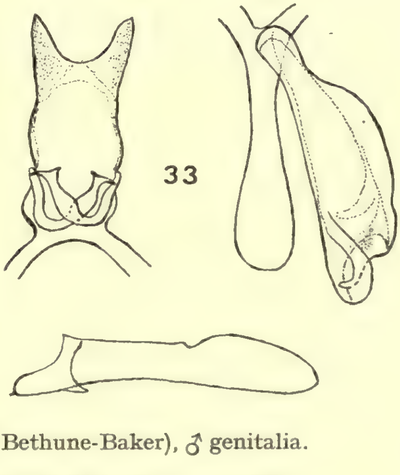

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FIG. 32. *Liptena septistrigata* (Bethune-Baker), ♂ genitalia.

FIG. 33. *Liptena subundularis* (Staudinger), ♂ genitalia.

Liptena subundularis (Staudinger)

(Pl. 4, figs 71, 74; Text-fig. 33)

Pentila *subundularis* Staudinger, 1891 : 215, ♂ ♀. LECTOTYPE ♂, GABON: Ogowe (*A. Mocquerys*) (BMNH), here designated [examined].

Staudinger's types of this species were mostly destroyed in the last world war. There is one male specimen in the BMNH collection which is believed to be one of the original series. In his description Staudinger states that a series was taken by A. Mocquerys at Ogowe. On our rather old male the locality label reads 'Ogowe Lambar. Moq.' and the original description agrees with this specimen. It also bears a label 'Origin.' which supports the belief that it belonged to the original series; it is designated lectotype. This example also agrees with the figure of *subundularis* given by Grose-Smith & Kirby (1892 : 63, pl. 18, figs 9, 10). The figure given by Aurivillius (1918 : pl. 63h) is poorly executed.

♂. *Upperside.* Ground colour dirty white. The base of the forewing has a slight brownish suffusion; the costa is brown throughout. The apical patch differs from that of *augusta* by having the internal border irregular, whilst that of *augusta* exhibits an even curve. There are traces of a brown marginal line on the hindwing which are strongest towards the anal angle. Fringes brown in the region of the apical patch of the forewing, white elsewhere.

Underside. Ground colour dirty white. The forewing bears a dark brown line at the base of the fringes; immediately basad of this is a yellowish line, which itself is bordered internally by a dark brown line that is interrupted by the veins and terminates at vein 3. There is an irregular brown line extending from the costa to vein 3. Traces of an oblique line are discernible across the wing apex, but the specimen is rather worn. The outer margin of the left forewing and two smaller areas on the other forewing have at some time been patched. The hindwing bears a pair of outer marginal lines, the innermost of the two being the heavier. The two or three transverse lines on the hindwing mentioned by Staudinger are not visible on this specimen, but are present, to a greater or lesser degree, on some other specimens in the BMNH collection. The authors believe that Staudinger's statement 'beim Kamerun-♀ und 1 ♂ fehlen alle drei Querlinien fast ganz' (translation: 'in the Cameroon ♀ and 1 ♂ all three transverse lines are almost completely absent') refers to this specimen.

Length of forewing: 15 mm. Legs yellow with scattered black scales; palpi pale yellow with the terminal joint black on the outside; antennae black, flecked with white beneath, the club tipped with dull orange.

♂ *genitalia.* Uncus composed of two elongate triangular lobes separated by a deep concavity. Subunci rather slender, curved, slightly swollen in their middle part; the distal extremities are anvil-shaped. Tegumen oval. Vinculum narrow with a long spatulate saccus. Valvae rectangular, the dorsal process ending in a broad hook, the ventral process rounded distally. Aedeagus long and stout with the distal third dilated.

Schultze (1923 : 1179) considered *augusta* to be a synonym of *subundularis*. This is not so, as the genitalia of the lectotype male cited above differ widely from those of *augusta*. Other external points of difference are: the inner border of the apical patch evenly curved in *augusta*, irregular in *subundularis*; base of the costal stripe clearly defined in *augusta* whilst in *subundularis* it is suffused, this suffusion invading the cell; hindwing underside of *subundularis* bears traces of transverse lines near the anal fold which are not present in *augusta*. In addition to the

Ogowe male there are in the BMNH collection three females from Cameroun and two females from Fernando Po; there are no examples of *augusta* from Gabon or Fernando Po.

MATERIAL EXAMINED.

Lectotype ♂, GABON: Ogowe, Lambar., Moq., Origin., dissection no. NHB. 1968–2757, B.M. Type No. Rhop. 17284.

FERNANDO PO: 1 ♀ (*Rev. W. Cooper*); 1 ♀, Hewitson coll. CAMEROUN: 1 ♀, Johann Albrecht's Hohe Station, 1898 (*L. Conradt*); 2 ♀, Port Victoria, 1919 (*Capt. Fitz-Roy*).

Liptena nigromarginata Stempffer

(Pl. 4, figs 72, 75; Text-fig. 34)

Liptena jacksoni Stempffer, 1954*a* : 9, ♂ ♀. Holotype ♂, UGANDA: Budongo, vii. 1936 (*T. H. E. Jackson*) (BMNH) [examined]. [Nom. praeocc.]

Liptena jacksoni Stempffer; Stempffer, 1954*b* : pl. 1, fig. 14.

Liptena nigromarginata Stempffer, 1961 : 43. [Replacement name for *Liptena jacksoni* Stempffer.]

This species ranges through forested areas of Uganda, Zaire and Congo (Brazzaville).

This species is similar to *simplicia* on the upperside, but is easily distinguished by the characters of the underside. *L. nigromarginata* does not have the broad brown outer marginal band on the hindwing underside that is present in *simplicia*, but possesses a distinctive subcostal blotch in cell space 6.

♂ *genitalia*. Uncus trapezoidal, the distal margin divided into two lobes by a deep median excision. The subunci are quite robust, curved and slightly swollen towards the extremity. Tegumen oval and slightly sclerotised. Vinculum moderately broad with a long spatulate saccus. Valvae rectangular, the dorsal process terminating in a recurved point, the ventral process broad with a rounded apex. Aedeagus of medium length, slightly swollen towards its rounded extremity and containing numerous cornuti.

MATERIAL EXAMINED.

♂ holotype, data given above.

CONGO (BRAZZAVILLE): 2 ♂, Etoumbi, –.xi.1958 (*T. H. E. Jackson*); 2 ♂, 2 ♀, Etoumbi, –.xii.1958 (*T. H. E. Jackson*); 1 ♂, Etoumbi Forest, 14.xii.1958 (*T. H. E. Jackson*); 1 ♀, Etoumbi, –.i.1959 (*T. H. E. Jackson*). UGANDA: allotype ♀, Katera vii. 1938 (*T. H. E. Jackson*); 1 ♀, Tero Forest, S.E. Buddu, 3800 ft, 26–30.ix.1911 (*S. A. Neave*); 1 ♀, Budongo –.vii.1939 (*T. H. E. Jackson*); 1 ♀, Katera, –.vii.1938 (*T. H. E. Jackson*); 2 ♀, Katera, Sango Bay, –.x.1953 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Katera, Sango Bay, –.xi.1953 (*T. H. E. Jackson*); 1 ♂, 2 ♀, Katera Forest, Masaka, –.x-xi.1953 (*van Someren*); 1 ♂, Katera Forest, Masaka, –.xi.1955 (*V. G. L. van Someren*).

Liptena subsuffusa Hawker-Smith

(Pl. 4, figs 73, 76; Text-fig. 35)

Liptena subsuffusa Hawker-Smith, 1933 : 7, ♂. Holotype ♂, ZAIRE: Upper Lowa Valley, nr Masisi, W. Kivu, 5000–6000 ft, forest and long grass, wet season, ii. 1924 (*T. A. Barns*) (BMNH) [examined].

Similar in appearance to *perobscura* but the male genitalia differ markedly. The female remains unknown.

No specimens have been added to the series in the BMNH collection since Hawker-Smith described the species from the 7 males in his possession in 1933.

Known only from Zaire.

Upperside ground colour pale creamy white. Forewing with the costa broadly blackish brown, just encroaching upon the upper limit of the cell, but not as broad as in *perobscura*. The blackish brown outer marginal area is approximately the same width as in *perobscura*. The discoidal spot merges into the costal band. On the hindwing the diffuse outer marginal brown band is much narrower than in *perobscura*. The discoidal spot of the underside is visible through the wing.

Underside ground colour white. On the forewing the costa and outer margin are suffused with brown scales, but isolating a white subapical patch. There is a well defined discoidal spot on the hindwing, and a black outer marginal line.

♂ *genitalia*. Uncus trapezoidal with a rounded depression at the distal margin. Subunci rather slender, dilated before the acute tip. Tegumen oval. Vinculum narrow with a long saccus. Valvae rectangular, the dorsal process with a slender, curved extremity, the ventral process slender and considerably longer. Aedeagus long, cylindrical, sinuate and only slightly dilated before the tip.

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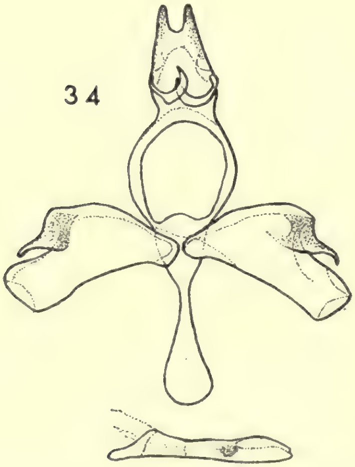

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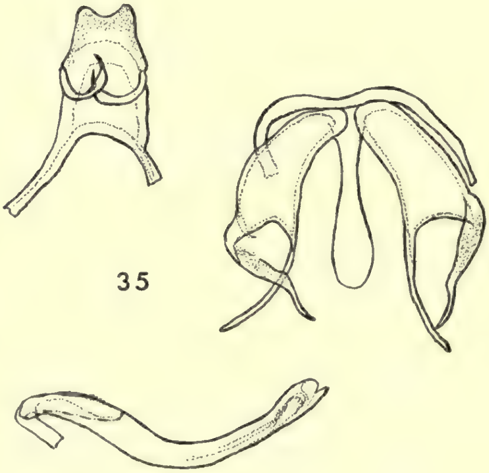


FIG. 34. *Liptena nigromarginata* Stempffer, ♂ genitalia.

FIG. 35. *Liptena subsuffusa* Hawker-Smith, ♂ genitalia.

MATERIAL EXAMINED.

♂ holotype, data given above.

ZAIRE: 1 ♂, Middle Lowa Valley, nr Walikali, 3000–4000 ft, forest –.ii.1924, wet season (*T. A. Barns*); 1 ♂, south side, middle Lowa valley, south of Walikali, W. Kivu, 3500 ft, forest, –.iii.1924, wet season (*T. A. Barns*); 4 ♂, data as holotype.

In the BMNH collection there are two females from Bitje, Cameroun. These insects appear to be close to *subsuffusa*, but differ from it in the width of the outer marginal bands, which on the hindwing upperside and all wings underside are three to four times broader than those of *subsuffusa*. It is considered inadvisable to name these specimens until further material is available.

Liptena perobscura Druce

(Pl. 5, figs 77, 80; Text-fig. 36)

Liptena perobscura Druce, 1910*a* : 363, pl. 33, fig. 13, ♀. Holotype ♀, CAMEROUN: Bitje, Ja River, 2000 ft, dry season (*G. L. Bates*) (BMNH) [examined].

Liptena kelle Stempffer, 1964 : 1231, figs 6, 7, ♂ ♀. Holotype ♂, CONGO (BRAZZAVILLE): Kelle, iv. 1963 (*T. H. E. Jackson*) (BMNH, Stempffer dissection no. 5792) [examined]. **Syn. n.**

This species occurs in Cameroun and Congo (Brazzaville). As Druce described only the female of *perobscura*, Stempffer's male holotype of *kelle* is here designated neallotype of this species.

♂. *Upperside.* Ground colour creamy white. Forewing with the basal, costal, apical, and outer marginal areas sooty, leaving only a small area of ground colour. On the hindwing the discoidal spot of the underside is visible through the wing; there is an outer marginal band of approximately 1·5 mm width.

Underside. Ground colour as upperside. Forewing with a small discoidal spot, two fine lines running out obliquely from the costa, and a pair of marginal lines. The hindwing bears three small, well defined spots in the basal area, which together with the discoidal spot are arranged in a diamond-shape. There are vague traces of other spots and lines towards the outer margin of the wing. The numerous markings on the hindwing underside of *perobscura* provide a quick means of separating it from *subsuffusa* which has only the single discoidal spot on the wing.

♂ *genitalia.* Uncus crescentic, slightly excised at the distal margin. Tegumen oval, fused to the uncus at the apex. Subunci short, considerably dilated in their middle region and terminating in a small, sharp point. Vinculum moderately large, prolonged ventrally by a short, massive, spatulate saccus. Valvae small, trapezoidal, the dorsal process furnished with short spines, ventral process short and digitate. Aedeagus short and robust with an unusual bulbous extremity.

MATERIAL EXAMINED.

♀ holotype, data given above.

CAMEROUN: 1 ♂, Bitje, Ja River, –.ix.x-xi.1911, Rothschild bequest; 1 ♂, Bitje, –.x & xi. 1910; 2 ♂, 3 ♀, Bitje, –.x & xi. 1912; 2 ♂, 1 ♀, Bitje, wet season, 1913. CONGO (BRAZZAVILLE): ♂ neallotype, data given above (*kelle* holotype, in synonymy) B.M. Type No. Rhop. 17285; allotype ♀ of *kelle*, data as ♂ neallotype; 1 ♂, Kelle, –.viii.1963 (*T. H. E. Jackson*).

Liptena evanescens (Kirby)

Pentila evanescens Kirby, 1887 : 364.

The colour and markings of the wings of this species are not particularly distinctive. The male genitalia (Text-fig. 37) are similar to those of *L. ochrea*. Recorded from Ivory Coast, Ghana, Nigeria, Cameroun, Fernando Po, Sao Tomé and Gabon.

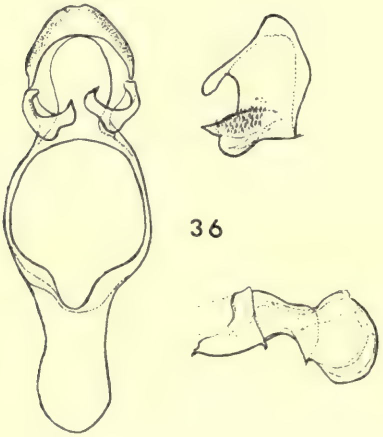
Liptena evanescens evanescens (Kirby)

(Pl. 5, figs 83–88; Text-fig. 37)

Pentila evanescens Kirby, 1887 : 364, ♂. Holotype ♂, CAMEROUN (BMNH, dissection no. NHB 1968–2734) [examined].
Pentila evanescens Kirby; Grose-Smith & Kirby, 1887 : pl. 2, figs 11, 12.
[*Liptena immaculata* 'Staudinger'; Aurivillius, 1925 : 333, 334. Misidentification.]

In 1868 Trimen described a new species of *Deloneura*, naming it *immaculata* (Trimen 1868 : 83, pl. 5, fig. 4). Aurivillius (1925 : 333–334) mistook Staudinger's remarks (Staudinger, 1888 : 268, pl. 94) concerning *immaculata* Trimen for an original description, transferring it to the genus *Liptena*. However, Aurivillius misidentified *immaculata* Trimen, and the insect to which he applied the name was in fact a specimen of *evanescens*. Two specimens in the BMNH collection agree with the brief description given by Aurivillius in the *Review*: 'Hindwing beneath with three very indistinct, fine, yellowish, postmedian transverse lines. Expanse of wings 27 to 28 mm.' The present authors consider the differences mentioned to be purely individual variation and sink *immaculata* sensu Aurivillius as a synonym of *evanescens*.

L. e. evanescens is recorded from Nigeria, Cameroun (Mamfe), and Fernando Po.



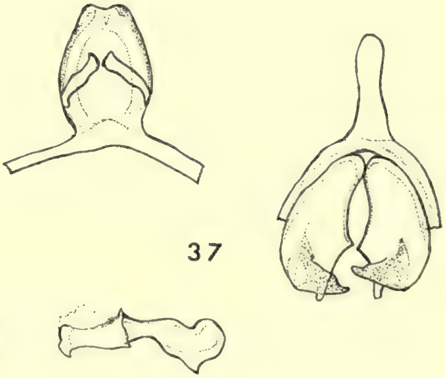


FIG. 36. *Liptena perobscura* Druce, ♂ genitalia.

FIG. 37. *Liptena evanescens* (Kirby), ♂ genitalia.

L. e. evanescens differs from *L. e. xanthis* by the following characters. The ground colour of both surfaces is much lighter, Nigerian specimens being a pale cream; there is little or no trace of an apical marking on the forewing upperside. In the BMNH series the expanse of *e. evanescens* varies from 25·5 to 28·0 mm in the males, and from 25·5 to 29·0 mm in the females. The size of *e. xanthis* ranges between 23·5 and 26·0 mm in the males, and between 24·5 and 27·5 mm in the females. Legs and palpi dark brown, antennae dark brown flecked with white beneath, the club tipped with dull orange.

♂ genitalia. Similar to those of *ochrea*. Uncus with a slight median depression in the distal margin. Tegumen oval. Subunci rather short and straight, slightly dilated distally and bearing a short hook at the tip. Vinculum of moderate width, prolonged by a saccus of medium length. Valvae rectangular, the broad dorsal process folded over the short ventral process. Aedeagus short and robust, dilated towards the rounded distal extremity and furnished with a large, strong tooth on the ventral surface.

MATERIAL EXAMINED.

♂ holotype, data given above.

NIGERIA: 2 ♀, Elele, Port Harcourt, –.i.1959 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Ikom, Ogoja Province, –.i.1956 (*T. H. E. Jackson*); 1 ♂, 1 ♀, Eket, southern Nigeria, 7.iii.1920, D. Cator coll.; 1 ♂, Aba, –.iv.1937 (*T. H. E. Jackson*); 1 ♂, Aba (*G. W. Jefferey*); 1 ♀, Mamu Awka, Onitsha Province, –.vi.1959 (*T. H. E. Jackson*); 2 ♂, Obubra, Abakaliki Province, –.vii.1960 (*T. H. E. Jackson*); 1 ♂, Udi, Onitsha Province, –.ix.1952 (*T. H. E. Jackson*); 1 ♀, Creek Town, southern Nigeria, i.x. 1920, D. Cator coll. CAMEROUN: 1 ♂, Mamfe, –.vii.1956, (*T. H. E. Jackson*); 1 ♂, Port Victoria (*Capt. Fitz-Roy*). FERNANDO PO: 1 ♀, 3–4000 ft, –.vi.1926 (*T. A. Barns*). GABON: 1 ♂, Ogowe, Godman & Salvin collection.

Liptena evanescens xanthis (Holland) **stat. n.**

Teriomima xanthis Holland, 1890 : 429. Numerous syntypes, probably of both sexes, GABON: upper R. Ogove (*A. C. Good*) (CM, Pittsburgh) [not examined].

Recorded from Ivory Coast, Ghana, Cameroun, Fernando Po, Sao Tomé, and Gabon. It has not been possible to examine Holland's types.

Although previously regarded as a synonym of *evanescens*, *xanthis* is here raised to subspecific rank. The status of *xanthis* is debatable as both *e. evanescens* and *e. xanthis* occur on Fernando Po; however, they do not seem sufficiently distinct to merit specific separation.

This insect can be distinguished from the typical form by its slightly smaller size and more yellow ground colour. *L. e. xanthis* usually has a brown patch towards the apex of the forewing upperside, but this varies in extent and does not quite reach the outer margin. There is a brown marginal line extending approximately to vein 3, and the base of the costa is brown.

L. e. xanthis is easily separated from *ochrea* as it lacks the dark costal band and large apical patch on the forewing upperside that are characteristic of *ochrea*.

Legs, palpi and antennae as in *e. evanescens*.

♂ genitalia. Hardly differ from those of *e. evanescens*.

♀. As the ♂, but slightly larger.

MATERIAL EXAMINED.

GHANA: 1 ♀, East Ashanti, –.i.1910 (*G. C. Dudgeon*). CAMEROUN: 1 ♂, Epulan, south Cameroun, 15.iv.1926 (*G. Schwab*); 1 ♀, Port Victoria (*Capt. Fitz-Roy*); 1 ♀, Johann Albrecht's Hohe Station, 1898 (*L. Conradt*); 2 ♀, Bitje, Adams bequest; 1 ♂, Bitje. FERNANDO PO: 4 ♂, 8 ♀ (*Rev. W. Cooper*); 2 ♂, 1 ♀, end of wet season, 650 ft (*Rev. W. Cooper*); 1 ♂, 1 ♀, Sta Isabel, –.v.1919 (*F. Escalera*); 1 ♂, as before, –.iv.1919; 1 ♂, ditto, –.viii. 1919; 2 ♂, ditto, –.ix.1919 (*F. Escalera*). SAO TOMÉ: 2 ♀, 1926 (*T. A. Barns*). GABON: 1 ♂, Lake Azingo, 4.xii.1907 (*Dr Ansorge*); 1 ♀, Ogowe, Godman & Salvin coll.; 2 ♀, Ogowe, Rothschild bequest; 1 ♂, 2 ♀, Gaboon.

Liptena ochrea Hawker-Smith

(Pl. 5, figs 78, 81; Text-fig. 38)

Liptena ochrea Hawker-Smith, 1933: 8, ♀. Holotype ♀, CAMEROUN: Bitje, Ja River, 2000 ft, wet season, iv.–v. 1912 (*G. L. Bates*) (BMNH) [examined].

This rare species is allied to *evanescens* and *undina*, but is easily separated from the latter by the underside characters. The underside of *undina* has precise markings in shades of yellow-ochre, brown and cream, the apical region of the forewing being especially distinctive; on the hindwing the discoidal line is absent. In *ochrea* the entire underside is ochreous, including the apical region of the forewing, and the transverse lines are orange. Some specimens of *evanescens xanthis* resemble *ochrea* on the underside, but on the upperside the dark costal and apical markings are far less extensive.

Hawker-Smith's female type came from Bitje, Cameroun and is in the BMNH; in addition there is one male and one female from Etoumbi, Congo (Brazzaville) in the collection. The male of this pair is here described as a neallotype; although this male has more extensive dark areas on the upperside than the female holotype, this is believed to be due to the difference in the localities and sex. There is a further male from Etoumbi in the Coryndon Museum, Nairobi (Jackson coll.).

♂. *Upperside.* Ground colour of all wings ochreous. Forewing with the costa brown, broadening considerably towards the apex and extending down the outer margin to vein 3. Beyond the cell a crescentic spur projects from the costal band. There is a faint brown discoidal line. Hindwing with a brown discoidal line and scattered brown scaling near the anal fold.

Underside. Ground colour ochreous but paler than on the upperside. Forewing bears an orange line along the outer margin. There are two indistinct subapical orange lines, and a darker postdiscal line, curving around the cell from the costa. There is a dark orange discoidal line and some marks within the cell that are of the same hue. Hindwing with a strong orange line along the outer margin and two weaker submarginal ones. The dark orange postdiscal line of the forewing is continued across the hindwing. There is a discoidal line of the same colour and a basal line from the costa to the anal fold.

Length of forewing: 12 mm. Legs black; palpi brown, paler at base; antennae black with while flecking, the club tipped with dull orange-brown.

♂ *genitalia.* Uncus crescentic, with a fairly broad, shallow excision on the distal margin; tegumen oval. Subunci short, straight, somewhat dilated near the tip. Vinculum narrow with a short, parallel-sided saccus. Valvae rectangular, with the dorsal process turned across the ventral and narrower one, both terminating in a bluntly rounded apex. Aedeagus short, slender centrally, then greatly dilated towards the distal extremity and with a marked bulge on the ventral margin.

MATERIAL EXAMINED.

♀ holotype, data given above.

CONGO (BRAZZAVILLE): ♂ neallotype, 'Etoumbi, Moyen Congo, Fr. Equat. Afr.', xii. 1958 (*T. H. E. Jackson*), dissection no. NHB 1968–2738, B.M. Type No. Rhop. 17290; 1 ♀, Etoumbi, –.i. 1959 (*T. H. E. Jackson*).

Liptena bolivari Kheil

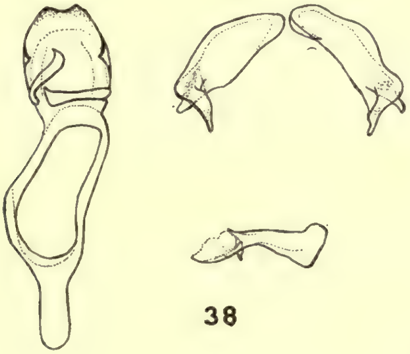
(Pl. 5, figs 79, 82; Text-fig. 39)

Liptena bolivari Kheil, 1905 : 173, ♂. Holotype ♂, EQUATORIAL GUINEA: Rio Muni (depository unknown).

The single male specimen described by Kheil was from Spanish Guinea, but the species has since been recorded from Nigeria, Cameroun and Gabon. A female neallotype is described here.

♀. *Upperside.* Ground colour ochreous, slightly darker than in *xanthostola* with which this species is often confused. Forewing with the base of the costa dusky. The internal border of the brown apical marking runs in an even curve from the costa to the outer margin and terminates at vein 2, thereby differing from that of *xanthostola* which often has a roughly toothed border and terminates abruptly. The hindwing shows traces of a fuscous marginal line on the lower part of the outer margin.

Underside. Ground colour bright ochreous. Forewing with a brown marginal line from the apex to vein 2. On the outer margin of the hindwing there are traces of a brown line at the vein endings.



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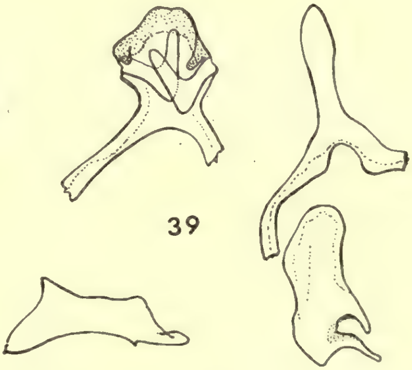

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FIG. 38. *Liptena ochrea* Hawker-Smith, ♂ genitalia.

FIG. 39. *Liptena bolivari* Kheil, ♂ genitalia.

Length of forewing: 13 mm. Legs and palpi black; antennae black flecked with dull white.

♂ *genitalia*. Differ widely from those of *xanthostola*. Uncus in the form of a shallow cone with a small process parallel with each of the subunci. Subunci very robust, anvil-shaped. Vinculum moderately broad with a long saccus. Valvae rectangular; the distal border of the dorsal process depressed in its central portion, this process becoming narrower towards its tip; the ventral process shorter and broader. Aedeagus short and stout with a small tooth on the ventral surface and an obliquely cut tip.

MATERIAL EXAMINED.

NIGERIA: ♀ neallotype, Ikom, Ogoja Prov., v. 1957 (*T. H. E. Jackson*), B. M. Type No. Rhop. 17291; 1 ♂, Obubra, Abakaliki Province, –.vii.1960 (*T. H. E. Jackson*); 1 ♂, Ubiaja, Benin Province, –.viii.1955 (*T. H. E. Jackson*). CAMEROUN: 1 ♂, Johann Albrecht's Hohe Station, 1898 (*L. Conradt*); 1 ♂, ditto, 1896 (*L. Conradt*); 2 ♂, Mamfe, –.xi.1956; 1 ♀, Mamfe, –.vii.1956 (*T. H. E. Jackson*). GABON: 1 ♂, Sembe, Souanke District, –.iii.1960 (*T. H. E. Jackson*).

Liptena undina (Grose-Smith & Kirby)

(Pl. 5, figs 89, 92; Text-fig. 40)

Pentila undina Grose-Smith & Kirby, 1894 : 117, pl. 25, figs 6, 7, ♂. Holotype ♂, ZAIRE: Kuilu (possibly in BMNH, see below).

This distinctive species does not appear to be closely related to any other in the genus. It is approximately the same size and colour as *xanthostola*. It occurs in Cameroun, Gabon, Congo (Brazzaville), and Zaire (Uele), and in Uganda.

Although Staudinger's types are believed to have been destroyed during the last world war, there is, in the BMNH collection, a pair of *undina* from Kuilu (the type-locality), collected by Mocquerys in 1892. The male of this pair is figured herein.

♂ *genitalia*. Uncus crescentic with a barely perceptible indentation at the apex. Subunci narrow, almost straight, with the terminal portion distended ventrally. Tegumen rectangular. Vinculum narrow with a long saccus of even width. Valvae roughly triangular, the dorsal process terminating in a small point, the ventral process triangular with a rounded apex. Aedeagus short and broad, with a blunt projection on the ventral margin near the extremity.

MATERIAL EXAMINED.

CAMEROUN: 1 ♂, Bitje, wet season (*G. L. Bates*); 2 ♀, 'Congo français', Joicey bequest. CONGO (BRAZZAVILLE): 1 ♀, Ketta Forest, –.vi.1960 (*T. H. E. Jackson*); 1 ♀, Ketta Forest, Ouesso, –.xi.1959 (*T. H. E. Jackson*); 1 ♀, Mambili, Ouesso, –.vi.1960 (*T. H. E. Jackson*); 1 ♂, Etoumbi, –.x.1960 (*T. H. E. Jackson*). ZAIRE: 1 ♂, 1 ♀, Kuilu, (*Mocquerys*), ex coll. Bethune-Baker; 1 ♂, 1 ♀, Kuilu (*Mocquerys*), 1892, Rothschild bequest. UGANDA: 4 ♂, 2 ♀, Budongo, –.viii.–ix.1934 (*T. H. E. Jackson*); 1 ♂, Budongo, –.ix.1934 (*T. H. E. Jackson*); 2 ♂, 6 ♀, Mpanga Forest, Toro, 4800 ft, 13–23.xi.1911 (*S. A. Neave*); 1 ♂, Katera, –.xi.1933, (*T. H. E. Jackson*).

Liptena xanthostola (Holland)

Teriomima xanthostola Holland, 1890 : 429.

This species is known from Sierra Leone, Ivory Coast, Ghana, Rio Muni, Gabon, Zaire, Uganda, Kenya and the Sudan. It is easily confused with *bolivari*, *overlaeti* and *fontainei*, but can be positively identified by examining the male genitalia, which differ markedly between species. Externally, *bolivari* has a deeper ground colour than *xanthostola*, *overlaeti* is a larger insect, and *fontainei* possesses a larger apical patch on the forewing upperside than does *xanthostola*.

Liptena xanthostola xanthostola (Holland)

(Pl. 5, figs 90, 93)

Teriomima xanthostola Holland, 1890 : 429. Numerous syntypes, probably of both sexes, GABON: upper R. Ogove (*A. C. Good*) (CM, Pittsburgh) [not examined].

Recorded from Cameroun, Rio Muni, Gabon and Zaire. It has not been possible to examine the types, but specimens in the BMNH collection agree with Holland's description.

On the *upperside* the ground colour of all wings is yellow, the costal band is blackish brown and of uniform width and may be as broad as 1 mm. The blackish brown apical patch has an evenly curved internal edge and extends almost to the tornus. Traces of a marginal line, present as brown scales, are visible on the lower part of the outer margin of the hindwing, near the anal angle.

Underside ground colour as upperside, the costa is finely black and there are traces of a dark marginal and submarginal line on the forewing in the apical region.

Average length of male forewing: 13 mm. Legs and palpi blackish brown; antennae black, flecked with white beneath and having a pale tip to the club.

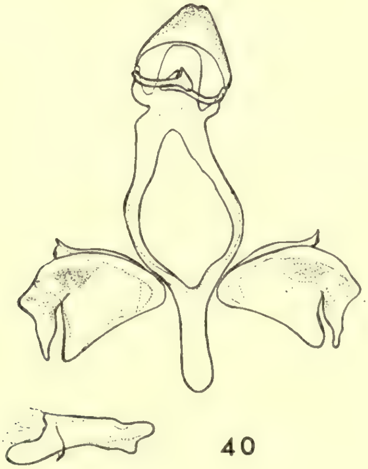

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FIG. 40. *Liptena undina* (Grose-Smith & Kirby), ♂ genitalia.

♂ *genitalia.* Uncus triangular, subunci short and straight, dilated distally and bearing a short hook at the tip. Tegumen oval. Vinculum narrow with a saccus of medium length. Valvae rectangular with a triangular apex. Aedeagus small, the distal third angled and having a blunt tip.

MATERIAL EXAMINED.

CAMEROUN: 1 ♂, Johann Albrecht's Hohe Station, 1898 (*L. Conradt*); 1 ♀, Bitje, Ja River, 2000 ft, –.iv–vi.1910, lesser rains (*G. L. Bates*). RIO MUNI: 1 ♂, Balengue, –.vi.1919 (*F. Escalera*). GABON: 1 ♂, Lake Azingo, –.xii.1907 (*Dr Ansorge*); 1 ♂, ditto, –.ii.1908; 1 ♀, Ogowe, Lambar., 1892 (*Mocquerys*); 1 ♂, 1 ♀, Ogowe, ex Bethune-Baker coll. ZAIRE: 1 ♀, Kuilu, 1892 (*Mocquerys*).

Liptena xanthostola coomassiensis Hawker-Smith

Liptena xantha coomassiensis Hawker-Smith, 1933 : 8, ♂. Holotype ♂, GHANA: Friapere Forest, Kumasi (BMNH, dissection no. NHB 1968–2744) [examined].

This subspecies is represented by specimens from Guinea, Sierra Leone, Ivory Coast and Ghana.

On the *upperside*, *x. coomassiensis* differs from nominate *xanthostola* by its slightly paler yellow ground colour, and in the form and extent of the apical patch. The internal edge of the patch runs in an even curve from mid-costa tapering to terminate at vein 3 on the outer margin. The *underside* does not differ from that of *x. xanthostola*.

There is a slight difference in size, *x. coomassiensis* generally being the larger by 2 or 3 mm in overall expanse. The ♀ is generally a little larger than the ♂. Legs and antennae as in *x. xanthostola*; palpi yellow at base with blackish brown tips.

♂ *genitalia.* Similar to those of *x. xanthostola*.

MATERIAL EXAMINED.

♂ holotype, data given above.

GUINEA: 1 ♂, N'zérékoré, 1900 ft, 29.v.–7.vi. 1926 (*C. L. Collenette*). SIERRA LEONE: 1 ♂, Fula Wusu, 12.iv.1903; 1 ♂, Fula Wusu, 16.iv.1903, D. Cator coll. IVORY COAST: 1 ♂, 1 ♀, Bingerville, 1915 (*G. Melou*); 5 ♂, Ivory Coast, 1919 (*Cremer*). GHANA: 1 ♂, West Ashanti, 1.i.1910 (*G. C. Dudgeon*); 1 ♂, 2 ♀, Ashanti, –.iii.1901 (*G. C. Dudgeon*); 1 ♀, 1909 (*Dudgeon*); 1 ♂, Volta River, Crowley bequest; 1 ♂, 1 ♀, Coomassie, Friapere Forest, 1913; 2 ♀, Coomassie, 21.ii.1913 (*J. D. G. Saunders*); 1 ♀, Western Province, under 100 ft, –.iii.1928 (*M. Portal Hyatt*).

Liptena xanthostola xantha (Grose-Smith) **stat. n.**

(Pl. 5, figs 91, 94; Text-fig. 41)

Teriomima xantha Grose-Smith, 1901 : 140, pl. 29, figs 13, 14, ♂. Holotype ♂, UGANDA: Entebbe (BMNH) [examined].

Represented in the BMNH by specimens from Angola (?), Zaire, Uganda, Kenya, and Sudan. The type is in the BMNH collection, and agrees with Grose-Smith's figures.

On the *upperside* the amount of brown coloration along the costa of the forewing is variable. The internal edge of the apical patch is gently angled at vein 4, the patch extending down the outer margin to terminate at vein 2.

On the *underside* there is no dark border to the costa of the forewing. An extremely fine black line is visible on the base of the fringes in the apical area of the forewing. On all wings are a pair of yellow lines which are little more than an intensification of the ground colour, and run parallel to the outer margin of the wings. In some specimens three similar yellow, transverse lines are discernible on the hindwing.

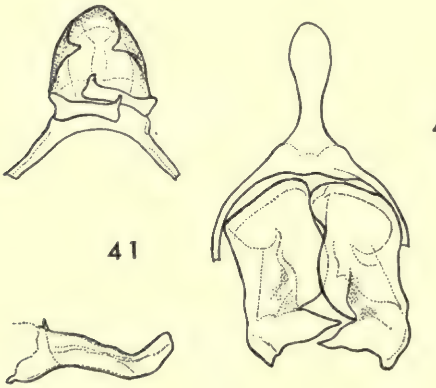
Some variation is apparent within the subspecies, the Zairian specimens being a deeper and brighter yellow; the specimens from the Sudan are larger than other *x. xantha* (length of ♂ forewing: 16–17 mm). Normal length of ♂ forewing approximately 15 mm, *x. xantha* is thus a little larger than the other two subspecies. The ♀ is slightly larger than the ♂; length of forewing in the ♂ holotype is 15 mm. Legs, palpi and antennae as in the nominate subspecies.

♂ *genitalia*. Similar to those of *x. xanthostola*.

MATERIAL EXAMINED.

♂ holotype, data given above.

ANGOLA: 2 ♂, 1 ♀, Moxico District, Zambesi-Congo Divide, 4000 ft, south-east Angola, –.x.1928 (*T. A. Barns*). ZAIRE: 4 ♂, 1 ♀, Itoa River, Ituri Forest, Congo-Semliki Watershed, –.i.1920 (*T. A. Barns*); 1 ♂, nr Lesse, west Semliki river, –.i.1920 (*T. A. Barns*); 1 ♂, middle Lowa valley, nr Walikali, 3–4000 ft, forest, –.ii.1924, wet season (*T. A. Barns*); 1 ♂, south side of middle Lowa valley, south of Walikali, 3500 ft, forest, –.iii.1924, wet season (*T. A. Barns*); 1 ♂, between Lindi and Lubila rivers, north of Batama, –.iv.1920 (*T. A. Barns*); 1 ♂, west Semliki valley, 3500 ft, forest, –.vi.1924 (*T. A. Barns*); 2 ♂, eastern upper Ituri valley, 30 miles south of Irumu, 3000 ft, tropical forest, –.vii.1924 (*T. A. Barns*); 1 ♀, lower Butahu river, Semliki valley, Xmas 1919, (*T. A. Barns*); 1 ♂, Semliki, Joicey bequest; 2 ♂, Sandoa, 21.xi.1920; 1 ♀, Sandoa, 27.xi.1921; 1 ♂, Congo, 11–16.ix.1926 (*F. G. Jackson*); 1 ♂, Katana, W. Kivu, 5–7000 ft, highland forest bordering pastureland, beginning of wet season, –.iv.1924 (*T. A. Barns*); 4 ♂, Katanga. UGANDA: the following specimens from Entebbe. 2 ♂, 12–20.i.1912 (*S. A. Neave*); 3 ♂, –.iii-v.1895 (*F. J. Jackson*); 3 ♂, 3.v.1895 (*F. J. Jackson*) Gowley bequest; 1 ♀, –.v.1900; 1 ♂, –.v.1900 (*Capt. H. B. Rattray*); 1 ♂, –.vi.1900, Joicey bequest; 1 ♂, 1 ♀, Entebbe Forest, 3800 ft, 5–11.vii.1911 (*S. A. Neave*); 1 ♂, 1 ♀, Entebbe Forest, Kitinda, –.vii.1951 (*V. G. L. van Someren*); 1 ♀, Entebbe, –.viii.1901 (*A. H. Neumann*); 1 ♂, 22.viii.1912 (*C. C. Gowdey*) 1 ♂, 1 ♀, –.ix.1900 (*Capt. H. B. Rattray*); 2 ♂, 1–11.ix.1911 (*S. A. Neave*); 2 ♂, 1 ♀, –.ix.1932 (*T. H. E. Jackson*); 2 ♂, 17–18.xi.1912 (*C. C. Gowdey*); 5 ♂, 1905 (*E. A. Minchin*); 1 ♂, Adams bequest; 2 ♂, 2 ♀, ex Bethune-Baker coll.; 1 ♀, Port Alice (Entebbe), 18.xi.1897 (*Dr Ansorge*); the following specimens from Bwamba: 10 ♂, –.iv-xii.1942 (*T. H. E. Jackson*) 2 ♂, –.vi.1942 (*T. H. E. Jackson*); 1 ♂, –.vii.1942 (*T. H. E. Jackson*); 1 ♀, –.vii.1944 (*T. H. E. Jackson*); 2 ♂, –.vii-viii.1946 (*V. G. L. van Someren*); 10 ♂, –.ix.1942 (*T. H. E. Jackson*); 5 ♂, –.x.1942 (*T. H. E. Jackson*); 5 ♂, Bwamba Forest, Semliki valley, 2300–2800 ft, 3–7.xii.1911 (*S. A. Neave*); 1 ♀, Buvuma Island, 22.iv.1905 (*Dr C. Christy*); 1 ♂, Toro, –.vi.1940 (*T. H. E. Jackson*); 1 ♂, Katera Forest, Masaka, .x,–.xi.1953 (*V. G. L. van Someren*); 1 ♀, ditto, –.x-xi.1956; 1 ♂, Katera, –.x.1932 (*T. H. E. Jackson*); 1 ♂, ditto, –.xi.1933; 2 ♂, Bukakata, Masaka road, forest, 17.i.1912 (*F. J. Jackson*); 1 ♂ western Ankole, 4500–5000 ft, 10–14.x.1911 (*S. A. Neave*); 1 ♂, Ankole-Toro border, east of L. George, 4500 ft, 20–21.x.1911 (*S. A. Neave*); 4 ♂, 1 ♀, Mpanga Forest, Toro, 4800 ft, 13–23.xi.1911 (*S. A. Neave*)· 2 ♂, 3 ♀, south of Lake George, 3200–3400 ft, 17–19.x.1911 (*S. A. Neave*)· the following specimens from Kayonza Forest, Kigezi: 2 ♂, 1 ♀, –.vi.1951 (*van Someren*)· 1 ♂, –.v-vi.1957 (*van Someren*); 2 ♂, –.ix.1952; 1 ♂, 1 ♀, –.viii.1951; 1 ♀, –.x.1953 (all collected by *V. G. L. van Someren*); 1 ♀, Mitano river forest, Kigezi, –.vi.1951 (*V. G. L. van Someren*); 1 ♀, Katera Forest, Mbarara, –.xi-xii.1951 (*van Someren*); 2 ♂, 1 ♀, between Mitiana and Entebbe, 3800 ft, 9–11.i.1912 (*S. A. Neave*); 1 ♀, Kampala, –.ii.1900, (*Capt. H. B. Rattray*); 1 ♀, ditto, –.iii.1900; 2 ♂, between Seziwa River and Kampala, 3500–3750 ft, 27–31.viii.1911 (*S. A. Neave*); 1 ♂, Kampala, –.xi.1933 (*T. H. E. Jackson*); 1 ♂, Unyoro, Budongo Forest, cool & dense, 3400 ft, 15.xii.1911 (*S. A. Neave*); 2 ♂ Budongo, –.vii-ix.1934 (*T. H. E. Jackson*); 2 ♂ ,Kamengo, Mawakota, –.ix.1953 (*V. G. L. van Someren*), 1 ♂, 1 ♀, Kamengo, Mawakota, –.viii.1953 (*van Someren*); 1 ♂, Kamengo, –.i.1935 (*T. H. E. Jackson*); 1 ♂, Kibali Forest, Toro, 5.vi-1956 (*van Someren*); 2 ♂, Kalinzu, –.ix.1948 (*van Someren*); 1 ♂, Marabigambo Forest, Lake Edward, –.ii.1956 (*T. H. E. Jackson*); 1 ♀, Mabira Forest, Chagwe, 3500–3800 ft, 16–25.vii.1911 (*S. A. Neave*); 1 ♂, Mulange, 30.v.1922 (*R. A. Dummer*); 2 ♂, 1 ♀, Mabira Forest, Kyagive, Mulange, 4000 ft (*R. A. Dummer*); 2 ♀, ditto, –.iv.–viii.1919; 3 ♂, 1 ♀, W. shores of Vic. Nyanza, Buddu, 3700 ft, 19–25.ix.1911 (*S. A. Neave*); 1 ♂, west shores of Vic. Nyanza, Buddu, 3700 ft, large forest, flat and sandy country, 19.i.1911 (*S. A. Neave*); 1 ♂, north-west shores of Vic. Nyanza, 3800–3900 ft, 12–15.ix.1911 (*S. A. Neave*); 1 ♂, Lake Albert Nyanza, Adams bequest. KENYA: 1 ♀, S. Kavirondo, –.iv.1932 (*V. G. L. van Someren*); 1 ♀, ditto, –.ix–xi.1932 (*van Someren*); 1 ♂, Ebua River Forest, Suna, S. Kavirondo, –.vi.1947 (*van Someren*); 1 ♂, Suna Kissii District, Kenya, –.vi.1947 (*T. H. E. Jackson*). SUDAN: 3 ♂, 2 ♀, Tambura, southern Bahr-el-Ghazal.



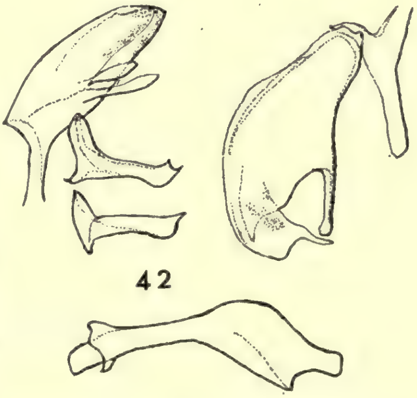


FIG. 41. *Liptena xanthostola xantha* (Grose-Smith), ♂ genitalia.

FIG. 42. *Liptena overlaeti* sp. n., ♂ genitalia.

Liptena overlaeti **sp. n.**

(Pl. 5, figs 95, 96; Text-fig. 42)

This species resembles *xanthostola xantha* in facies, but the distinctive male genitalia easily distinguish it from *x. xantha* or any other *Liptena* species.

♂. *Upperside.* Ground colour paler than in *x. xantha.* Forewing with the costa brown throughout its length, the apical marking extending down the outer margin to terminate abruptly between veins 2 and 3, this being the only marking on the upperside.

Underside. Ground colour paler than that of *x. xantha.* There is a fine, dark, outer marginal line corresponding to the apical patch of the upperside. Wings immaculate.

Length of forewing: 16·5 mm, expanse 31 mm; this is slightly larger than that shown by specimens of *x. xantha* from the same locality. Legs and palpi as in *x. xantha*; antennae with the tip of the club black, which in *x. xantha* is yellow.

♂ *genitalia.* Uncus large and oval with a process on either side, stretching outwards parallel with the subunci; subunci curved, longer than those of *xanthostola*, and in this example asymmetrical. Vinculum narrow. Valvae oval, the dorsal process ending in a long, curved projection, the ventral process digitate. Aedeagus of unusual shape – the proximal extremity is squarely cut and the basal half is greatly enlarged, while the distal half is cylindrical.

♀. Unknown.

MATERIAL EXAMINED.

Holotype ♂, ZAIRE: Katanga, Kapanga, –.x.1932 (*F. G. Overlaet*) (in coll. H. Stempffer).

Liptena fontainei **sp. n.**

(Pl. 6, fig. 97; Text-fig. 43)

A single male of this new species was discovered by M. Stempffer among a series of *x. xantha*, collected from Paulis by Dr M. Fontaine, and in the collection of the MRAC Tervuren.

♂. *Upperside.* Ground colour sulphur yellow. Forewing with the broad black costal band invading the upper part of the cell; the black apical patch is larger than that of *x. xantha* and terminates abruptly between veins 2 and 3 on the outer margin; the inner edge of the patch is slightly irregular. Hindwing immaculate.

Underside. Ground colour slightly paler than on upperside. Forewing with a fine, black, marginal line from the apex down to vein 2. Hindwing immaculate. Fringes yellow.

Length of forewing: 12·5 mm, expanse 23·5 mm. Legs black with some yellow scales; palpi black with a fine yellow line beneath, up to the tip; antennae black, yellow-ringed, the club elongate and black.

♂ *genitalia.* Uncus trapezoidal, with a rounded depression in the distal margin; either side of the uncus bears a curved process parallel to the subunci, as in *overlaeti*; subunci stout, anvil-shaped – rather reminiscent of those of *bolivari.* Vinculum rather narrow. Valvae rectangular, the dorsal process ending in a curved blunt point, the ventral process very short and stumpy. Aedeagus of distinctive shape – rather like a boomerang – long and arched, swollen centrally and with an acute tip.

♀. Unknown.

MATERIAL EXAMINED.

Holotype ♂, ZAIRE: Uele, Paulis, 26.vii.1956 (*Dr M. Fontaine*) (in collection of MRAC, Tervuren.)

Liptena homeyeri Dewitz

Liptena homeyeri Dewitz, 1884 : 188, pl. 1, figs 3, 3a.

L. homeyeri is one of the larger species of *Liptena*. It reaches its greatest size in Zaire, where it is usually approximately 40 mm in the male, 45 mm in the female. The upperside markings are reminiscent of those of *ferrymani*, but the unusual markings of the underside have no parallel with any other species included here.

Liptena homeyeri homeyeri Dewitz

(Pl. 6, figs 98, 99)

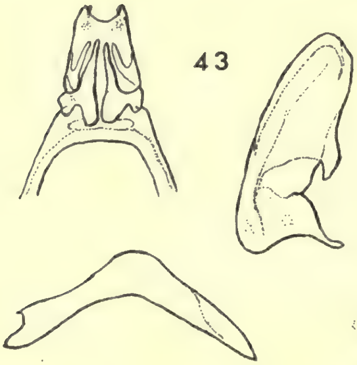
Liptena homeyeri Dewitz, 1884 : 188, pl. 1, figs 3, 3a. Type(s), 'WESTAFRIKA' (depository unknown).

Recorded from Zaire, south-eastern Angola, Rhodesia and Tanzania.

♂ *genitalia*. Uncus in the form of a truncated cone with a slight median depression; subunci long, curved and uniformly slender. Tegumen oval. Vinculum of moderate width with a short, broad saccus. Valvae rectangular, the dorsal process with a rounded apex and a long, fine lateral projection, the ventral process reduced to a broad, rounded lobe. Aedeagus long, very slightly arched with an obliquely cut tip.

MATERIAL EXAMINED.

ZAIRE: 1 ♀, Lualaba R. (*A. Yale Massey*); 1 ♂, Lualaba valley, Kansanshi, –.iii.1906, Adams bequest; 1 ♀, Lualaba River, 2500–4000 ft, 20.v.1907, Neave coll.; the following specimens from Riuwe, 5000 ft, Lualaba valley: 2 ♂, 23.iii.1906; 1 ♂, 22.iii.1906; 3 ♂, 1 ♀, 26.iii.1906; 2 ♂, 28.iii.1906; 1 ♂, 4.iv.1906; 1 ♀, Katanga district, nr Riuwe, about 15 miles west of Lualaba River, 10°45′ S., 3000 ft, 1.v.1904 (*H. Cookson*); 1 ♂, Lufira valley, –.xi-xii.1918 (*T. A. Barns*); 3 ♂, Panda R., Lufira



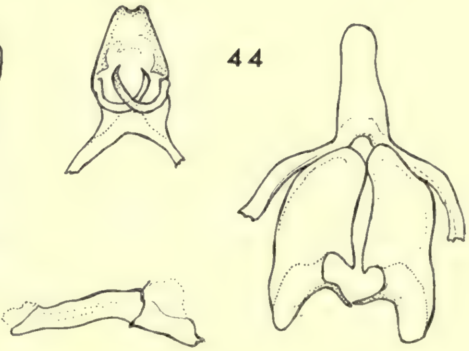


FIG. 43. *Liptena fontainei* sp. n., ♂ genitalia.

FIG. 44. *Liptena homeyeri straminea* subsp. n., ♂ genitalia.

valley, –.v.1919 (*T. A. Barns*); 1 ♂, Kikura stream, Lufira valley, 15.iv.1919 (*T. A. Barns*); 2 ♀, Kolwezi, Katanga, –.iv.1959 (*R. H. Carcasson*); 1 ♂, Katanga, upper Dikulwe valley, 4000 ft, 21.iii.1907, (*S. A. Neave*); 1 ♂, Katanga, upper Dikulwe valley, 4000 ft, 22.iii.1907 (*S. A. Neave*); 5 ♂, 9 ♀, Katanga, Joicey bequest; 1 ♂, Katanga, 1924 (*T. H. E. Jackson*); the following specimens from Kambove, Katanga, 4–5000 ft, all from the Neave collection: 1 ♀, 3.iv.1907; 1 ♂, 20.iii.1907; 3 ♂, 1 ♀, 25.iii.1907; 2 ♂, 21.iii.1907; 2 ♂, Luvua River, east bank, 85 miles north of Lake Mweru, about 3000 ft, –.iv.1922, end of wet season (*T. A. Barns*); 1 ♀, Katanga district, between Lunganda and Lbwita R., 3000 ft, 21.xi.1903 (*H. Cookson*); 2 ♂, Luajoula valley, –.xii.1917 (*T. A. Barns*); 1 ♂, Mwene-Mukoji, 31.iii.1921; 1 ♂, Sandoa, 18.x.1920, Rothschild bequest; 1 ♂, Huapulaku, –.xii.– (*T. A. Barns*). ANGOLA: 5 ♂, Zambesi-Congo Divide, Moxico district, south-eastern Angola, 4000 ft, –.x.1928 (*T. A Barns*); 1 ♂, Zambesi-Kasai Watershed, south-eastern Angola, 4000 ft, –.x.1928 (*T. A. Barns*). RHODESIA: 2 ♂, north-west Rhodesia, Joicey bequest; 3 ♂, 4 ♀, ditto (*H. Cookson*); 2 ♀ ditto (*H. C. Dollman*); 1 ♀, Chambesi, northern Rhodesia, 22.iv.1917 (*T. A. Barns*); the following specimens from Solwezi: 4 ♂, 1 ♀, –.iii.1917, ex Bethune-Baker coll.; 2 ♂, 16.iii.1917, ex Bethune-Baker coll.; 1 ♂, Solwezi, 26°20′ E., 12°10′ S., 4.iv.1917 (*H. C. Dollman*); 1 ♂, 6.iv.1917 (*H. C. Dollman*); 1 ♂, Solwezi district ,26°20′ E., 12°10′ S., –.xii.1916 (*H. C. Dollman*). TANZANIA: 2 ♂, 5 ♀, Region de M'pala (R. P. Guillemé).

***Liptena homeyeri straminea* subsp. n.**

(Pl. 6, figs 100, 101; Text-fig. 44)

A series of 36 specimens in the BMNH collection show constant differences from the typical examples of *homeyeri*. All dark markings on both surfaces are less extensive.

♂. *Upperside*. Ground colour orange-yellow – markings dark brown. Forewing with a fuscous suffusion at base of costa, the apical patch covering the distal third of the costa and extending down the outer margin to vein 4, continuing very narrowly to vein 3. The internal edge of the apical patch is irregular. A small projection from the costa, just beyond the end of the cell, is very faint in the type-specimen but quite distinct in some other males of the series. On the hindwing the markings of the underside are just visible through the wing.

Underside. Ground colour as upperside – markings black. Forewing with the distal third of the costa black, and a black outer marginal line which terminates at vein 3. There is an oblique subapical band, which is much narrower than in typical *homeyeri*. The projection from the costal band is more heavily marked than on the upperside. Hindwing with the markings more reduced than in the nominate subspecies. There are three spots in cell space 1 parallel with the anal fold, a further three spots are all that remain of a postmedian transverse row, and a larger spot in cell space 7, posterior to the costal vein. Apart from the more restricted markings, *h. straminea* can be positively separated from *h. homeyeri* by the following marking on the hindwing underside: in *h. homeyeri* there are always two black spots near the costa, one midway along, the other more basal; in all our specimens of *h. straminea* this more basal spot of the two is entirely absent.

Length of forewing: 20 mm. Legs orange; palpi black, with the inner surface orange; antennae black, flecked with white beneath, the club tipped with orange-brown.

♂ *genitalia*. Do not differ from those of the typical form.

♀. Size and markings as in male.

MATERIAL EXAMINED.

Holotype ♂, ANGOLA: Bange Ngola, 5.x.1903 (*Dr Ansorge*), B.M.Type No. Rhop. 17292.

Paratypes. ANGOLA: allotype ♀, Bange Ngola, 7.x.1903 (*Dr Ansorge*), B.M. Type No. Rhop. 17293; 4 ♂, as holotype; 3 ♂, as allotype; 1 ♂, same locality and collector, 6.x.1903; 1 ♂, ditto, 9.x.1903; 15 ♂, Samba Acenda, 14.x.1903 (*Dr Ansorge*); 4 ♂, Chissamba, Bihé, 19.xi.1904 (*Dr Ansorge*); 1 ♂, Duque de Braganza, 28.x.1903 (*Dr Ansorge*); 1 ♂, Quango, Suffert coll.; 1 ♂, Prov. Lunda, Xassengue, 7.iv.1937 (*M. A. Excell*); 1 ♂, Prov. Lunda, Cucumbi, 30.iii.1960 (*Père Mercier*), in Stempffer coll.; 1 ♂, Pedreira, Bihé, 7.xi.1904 (*Dr Ansorge*); 1 ♂, Ceramba, Bihé, .–.iii.1903 (*W. C. Bell*); 1 ♀, Pungo Andongo, 1.vii.1903 (*Dr Ansorge*).

Liptena rochei Stempffer

(Pl. 6, fig. 102; Text-fig. 45)

Liptena rochei Stempffer, 1951 : 66, fig. 1, ♂♀. Holotype ♂, NIGERIA: Lagos, vi. 1950 (Stempffer coll.) [examined].

This species is allied to *flavicans* but differs from it by its smaller size and by the ground colour, which is yellowish orange on both surfaces. On the hindwing underside the brown markings are less extensive. The female usually has a slightly paler ground colour than the male.

L. rochei occurs in Sierra Leone, Liberia, Ivory Coast, Ghana and Nigeria. Examples from Ivory Coast are more orange than those from Nigeria, specimens from Ghana being intermediate.

♂ *genitalia*. Uncus crescentic with a shallow depression in the distal margin; subunci distinctive, their distal third divided into two processes. Tegumen oval. Vinculum narrow, prolonged by a long, slender saccus. Valvae rectangular; the dorsal process broad and produced into a hook at the tip; the ventral process more slight, of equal length but curved at the extremity. Aedeagus long and very slender, curved at the tip.

MATERIAL EXAMINED.

♂ holotype, data given above.

SIERRA LEONE: 2 ♂, 1 ♀, Mabang, 26.xii.1903, D. Cator coll.; 3 ♂, 1 ♀, ditto, 27.xii.1903; 1 ♂, 2 ♀, ditto, 28.xii.1903. LIBERIA: 2 ♂, 1 ♀, Kpaine, 1400 ft, 7°10′ N. 9°7′ W., 18.iii.1954 (*Dr W. Peters*). GHANA: 1 ♀, Accra, Rothschild bequest; 1 ♂, Assesewase, –.iii.1906 (*G. C. Dudgeon*); 2 ♂, Aburi, 14.iv.1941 (*K. M. Guichard*); 2 ♂, Friapere Forest, Coomassie, 1913; 1 ♂, Joicey bequest. NIGERIA: 1 ♀, Otta, Lagos, –.i.1953 (*P. Roche*); 1 ♀, Isheri, Lagos, southern Nigeria, 12.iii.1950 (*P. Roche*); 1 ♀, Lagos district, –.vii.1947 (*P. G. L. Roche*); 2 ♂, Ubiaja, Benin Prov., –.vii.1955 (*T. H. E. Jackson*).

Liptena flavicans (Grose-Smith & Kirby)

Pentila flavicans Grose-Smith & Kirby, 1891 : 50, pl. 12, figs 5–8.

This species occurs in Liberia, Ivory Coast, Nigeria, Cameroun, through the Congo basin, and in Uganda. The only other *Liptena* species of similar appearance is *rochei*, which is found from Sierra Leone eastwards as far as Nigeria. *L. rochei* is a smaller species and is easily recognized by the rectangular costal blotch on the hindwing underside; in addition, the male genitalia show marked differences.

Liptena flavicans flavicans (Grose-Smith & Kirby)

(Text-figs 46, 47c)

Pentila flavicans Grose-Smith & Kirby, 1891 : 50, pl. 12, figs 5–8, ♂ ♀. ♂, ♀ types, CAMEROUN: Barombi (probably destroyed).

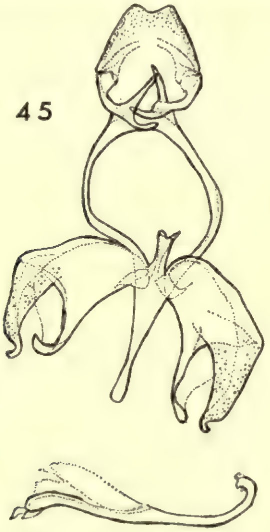
Recorded from west and south Cameroun.

On the upperside the costa in most specimens is fuscous throughout its length. The outer margin of the hindwing bears an irregular brown band. On the hindwing underside a break in the transverse brown bars allows the fusion of two patches of yellow ground colour.

The type of *flavicans* was in the Staudinger collection and is presumed destroyed in the last world war. There is no syntype available, and as the species was well illustrated in the original description it is not considered necessary to designate a neotype.

This species is subject to a fair degree of individual variation.

45



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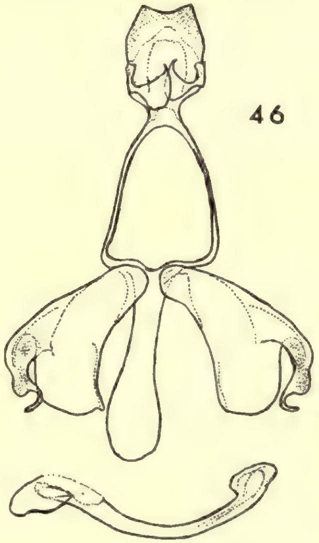

FIG. 45. *Liptena rochei* Stempffer, ♂ genitalia.

FIG. 46. *Liptena flavicans flavicans* (Grose-Smith & Kirby), ♂ genitalia.

♂ *genitalia.* The genitalia of the subspecies are identical. Uncus crescentic, slightly excised at the distal margin. Subunci short, strongly dilated. Tegumen oval. Vinculum narrow with a long, spatulate saccus. Valvae broad, the dorsal process ending in a hook, the ventral process wide with a rounded apex. Aedeagus long and slender, curved, and dilated towards the tip.

MATERIAL EXAMINED.

CAMEROUN: the following specimens from Bitje, Ja River, 2000 ft: 1 ♂, 1.ii.1920 (*G. L. Bates*); 1 ♂, 1.ii.1921 (*G. L. Bates*); 1 ♀, –.i-iii.1907, dry season (*G. L. Bates*); 1 ♂, –.iv.– (*G. L. Bates*); 5 ♂, –.iv-vi.1910, lesser rains (*G. L. Bates*); 2 ♂, 2 ♀, –.iv-v.1909, wet season; 2 ♂, 1 ♀, early v. and vi, wet season; 2 ♂, 1 ♀, 4.v.1912, wet season (*G. L. Bates*); 2 ♂, –.vi. and vii.1909, ex coll. Ed Brabant; 1 ♂, –.vi-vii 1909, Adams bequest; 3 ♂, –.vi-vii.1909, dry season, ex Bethune-Baker coll.; 2 ♂, –.ix.1908, ex Bethune-Baker coll.; 1 ♂, –.x.1907, Adams bequest; 1 ♀, –.x. 1908, Adams bequest; 5 ♂,–.x.1909; 2 ♂, 2 ♀,–.ix-x-xi.1911; 1 ♂, 1 ♀, –.x,xi.1912; 4 ♂, –.x-xi.1913, wet season; 1 ♀, –.xi.1909; 2 ♀, Bitje, 3°N., 12°E., wet season, 1926 (*G. L. Bates*); 14 ♂, 8 ♀, Bitje, little other data.

Liptena flavicans oniens Talbot

(Text-fig. 47b)

Liptena flavicans subsp. *oniens* Talbot, 1935 : 72, pl. 1, fig. 6, ♂♀. Holotype ♂, NIGERIA: 70 miles E. of Lagos, in forest 1 mile E. of Oni, 10.iii.1912 (*W. A. Lamborn*) (UM, Oxford) [examined].

Recorded from Liberia, Ivory Coast, Nigeria and west Cameroun.

On the upperside the ground colour is a paler yellow than in typical *flavicans*, and the apical marking is more reduced. On the forewing the proximal half of the costa is yellow. On the lower part of the hindwing the outer margin bears an irregular brown band. On the hindwing underside the brown bars in the upper part of the median area have disappeared, leaving a conspicuous patch of yellow ground colour.

MATERIAL EXAMINED.

♂ holotype, data given above.

LIBERIA: 1 ♂, 30 miles east of Monrovia, 200 ft, –.ii.1926, dry season (*M. Portal Hyatt*). NIGERIA: 1 ♂, Akpabuyo, southern Nigeria, –.i.1921, D. Cator coll.; 1 ♂, ditto, –.ii.1921; 3 ♂, Oban, –.i.1921, D. Cator coll.; 2 ♂, 1 ♀, Ikom, Ogoja Prov., –.ii.1956 (*T. H. E. Jackson*); 2 ♂, ditto, –.i.1956; 1 ♂, Ikom, Ogoja Province, –.x.1955 (*T. H. E. Jackson*); 1 ♂, Oshodi, Lagos district, –.iv.1955 (*T. H. E. Jackson*); 1 ♂, Ilaro, Lagos District, –.iv.1955 (*T. H. E. Jackson*); 1 ♂, Uwet, southern Nigeria, –.v.1920, D. Cator coll.; 1 ♂, Ubiaja, Benin Province, –.vi.1955 (*T. H. E. Jackson*); 1 ♂, Eket, southern Nigeria, –.ix.1920, D. Cator coll.; 1 ♂, Mamu Awka, Onitsha Province, –.xi.1959 (*T. H. E. Jackson*); 1 ♂, Elele, Port Harcourt, –.xii.1958 (*T. H. E. Jackson*); 2 ♂, Gregiani (*Dr Ansorge*). CAMEROUN: 1 ♂, Mamfe, –.i.1957, (*T. H. E. Jackson*); 2 ♂, ditto, –.vii.1956; 2 ♂, Johann Albrecht's Hohe Station, 1896 (*L. Conradt*); 1 ♂, ditto, 1898; 1 ♂, Bitje, Ja River, –.xi.1909, ex Bethune-Baker coll.

Liptena flavicans praeusta Schultze

(Pl. 6, figs 103, 106; Text-fig. 47a)

Liptena flavicans var. *praeusta* Schultze, 1917 : 38, ♂♀. LECTOTYPE ♂, CAMEROUN: N'ginda, 21.xi.1910 (*A. Schultze*) (ZSBS, Munich), here designated [examined].

Range: south Cameroun and Congo Basin. In the original description Schultze says that *praeusta* is found in the whole of the Congo Basin. He was correct in his assumption for we have specimens from Etoumbi and Ouesso, and from as far east as Beni, Ituri district. There is a syntype, which is here designated the lectotype, in the ZSBS, Munich.

♂. *Upperside*. Differs from other subspecies of *flavicans* by having a deeper ground colour; it is a glowing orange which is especially intense on the forewing. The brown costal band has a triangular extension at the end of the discoidal cell, and the apical marking is a little more extensive than in typical *flavicans*. The outer margin of the hindwing bears a brown band from vein 4 to the anal angle.

Underside. The hindwing shows regular brown bars of uniform width on the yellow ground. Other features as in *f. flavicans*. Legs orange with scattered fuscous scales on the femoral and tibial portions, ringed with fuscous on the tarsi.

Length of forewing: 18 mm. Palpi orange with black tips. Antennae black with orange-tipped clubs, and with pale markings between the annuli on the ventral and lateral surfaces.

MATERIAL EXAMINED.

Lectotype ♂. CAMEROUN: 'Süd-Kamerun N'ginda (*Dr Arnold Schultze*), 21.xi.1910', '*L. flavicans* v. *praeusta* Schultze, Dr Arn. Schultze determ. 1920 ♂.'

CONGO (BRAZZAVILLE): 2 ♂, Etoumbi, –.i.1959 (*T. H. E. Jackson*); 1 ♂, ditto, –.vii. 1960; 1 ♀, ditto, –.xii.1958; 1 ♂, Ketta Forest, Ouesso, –.ix.1959 (*T. H. E. Jackson*); 1 ♂, ditto, –.x.1959. ZAIRE: 1 ♂, Beni, Ituri, 4000 ft, –.iii.1947 (*T. H. E. Jackson*); 1 ♂, ditto, –.x.1946; 1 ♀, ditto, –.xi.1946.

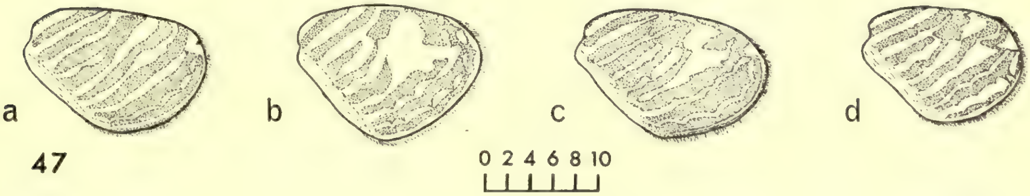

FIG. 47. Underside hindwing detail of *Liptena flavicans* subspecies:

(a) *praeusta*, (b) *oniens*, (c) *flavicans*, (*d*) *katera*.

Liptena flavicans aequatorialis Stempffer

Liptena flavicans aequatorialis Stempffer, 1956 : 8, pl. 2, figs 3, 4, ♂. Holotype ♂, ZAIRE: Eala, Tshuapa (MRAC, Tervuren) [examined].

The type-locality is in Zaire, near Coquilhatville.

In *f. aequatorialis* there is no brown outer marginal band on the hindwing upperside, as there is in the other subspecies. The design of the barring on the hindwing underside is similar to that of *f. praeusta*, but the dark coloration is purplish wine instead of fuscous. The upperside ground colour is yellowish orange. A female specimen in the MRAC, Tervuren, is now designated as the neallotype. The external features are as in the male, and the expanse is 36 mm.

MATERIAL EXAMINED.

♂ holotype, data given above.

ZAIRE: ♀ neallotype, Eala, Tshuapa, vi. 1936 (*J. Ghesquière*).

Liptena flavicans katera Stempffer

(Text-fig. 47d)

Liptena flavicans katera Stempffer, 1956 : 8, pl. 2, figs 5, 6, ♂ ♀. Holotype ♂, UGANDA: Katera, xi. 1953 (BMNH) [examined].

The ground colour of the upperside is yellow, but is paler than in other subspecies. Forewing with a brown costal band, the apical marking angled and not very large. The outer margin of the hindwing bears sparse fuscous scaling. On the underside the ground colour of the hindwing is very pale – almost white – the dark bars in the median area are rather narrow but complete. Length of forewing: ♂ 17 mm, ♀ 19 mm.

MATERIAL EXAMINED.

The type-series is the only material available.

Liptena durbania Bethune-Baker

(Pl. 6, figs 104, 107; Text-fig. 48)

Liptena durbania Bethune-Baker, 1915 : 189, ♂. Holotype ♂, CAMEROUN: Bitje, Ja River, 2000 ft, x–xi. 1912 (BMNH) [examined].

Liptena rectifascia Hawker-Smith, 1933 : 8, ♂. Holotype ♂, CAMEROUN: Bitje, early May and June, wet season (BMNH) [examined].

The short series in the BMNH collection shows the following characters.

Upperside. Ground colour deep tawny-orange. Forewing with a broad, dark brown costal stripe which extends inwards to vein 6. The border of the apical patch is convex and the patch extends down the outer margin as far as vein 3; a dark brown marginal line continues to the tornus. The hindwing is without markings except for traces of a brown marginal line.

Underside. Ground colour of forewing orange, paler than on the upperside. Irregular brown and fawn bands are present in the apical area. An oblique stripe, 1·5 mm in breadth, arises from the costa at the end of the discoidal cell. Hindwing fawn, marked by irregular brown bands.

♂ *genitalia*. Uncus bearing two blunt lobes separated by a deep concavity. Subunci slender, tapering to a point. Below the insertion of the subunci the uncus is expanded to form 'shoulders'. Vinculum broad with a short, narrow saccus. Valvae triangular, the dorsal process with the tip curved upwards; ventral process narrow. Aedeagus curved, dilated at the base, distal half slender.

MATERIAL EXAMINED.

♂ holotypes of *durbania* and *rectifascia*, data given above.

CAMEROUN: 1 ♂, as *durbania* type; 1 ♂, Bitje, –.x & xi. 1910; 1 ♀, Bitje, Ja River, –.ix-x-xi.1911, Rothschild bequest. GABON: 1 ♀, Sembe, Souanke district, –.ii.1960 (*T. H. E. Jackson*).

Liptena bergeri sp. n.

(Text-fig. 49)

We have pleasure in naming this insect after Mr L. A. Berger of the MRAC, Tervuren.

A single male of this new species was discovered in the MRAC, Tervuren, by M. Stempffer. In facies it is hardly distinguishable from *durbania*, but is easily separable on genitalic characters.

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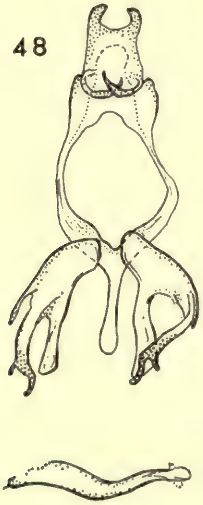

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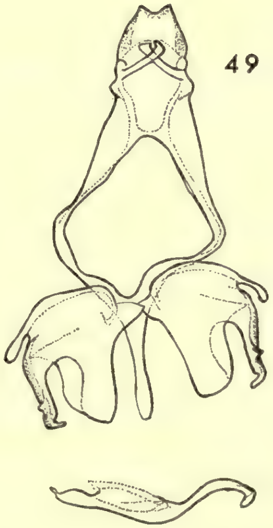

FIG. 48. *Liptena durbania* Bethune-Baker, ♂ genitalia.

FIG. 49. *Liptena bergeri* sp. n., ♂ genitalia.

♂. *Upperside.* Ground colour deep orange. Forewing with a dark brown costal stripe, which is slightly excised at the end of the discoidal cell, but gradually widens into the apical patch. The patch extends down the outer margin, tapering to terminate at vein 3. Hindwing without markings, but a few scattered fuscous scales are present in the anal fold. Fringes of all wings dark brown.

Underside. Ground colour of forewing orange, of a lighter tone than on the upperside and slightly paler towards the inner margin. The apical area is marked by indistinct fawn and light brown bands, as in *durbania*. There is an oblique light brown stripe from the costa at the end of the discoidal cell and a discoidal line of the same hue. Hindwing ground colour fawn with the following light brown markings: two complete submarginal bands which appear somewhat blurred, basad to these are two irregular bands which are slightly broader and are broken at vein 6; a more distinct discoidal stripe, followed by a further two marks within the cell. Other vague marks are present in the basal area of the wing.

Length of forewing: 16 mm. Legs light fawn with black markings, the ungulae black; antennae black, flecked with white, the club orange dorsally.

♂ *genitalia.* Uncus widely excised at the distal margin, very distinct from that of *durbania*. Subunci slender and straight, hooked at the tip. Vinculum broad, saccus narrow and only lightly chitinized. Valvae approximately triangular, much broader than those of *durbania*; the dorsal process bears a digitate projection at its origin, also a tooth-like projection is present towards the tip; the slender tip is curved downwards; the ventral process is massive and evenly rounded distally, unlike that of *durbania*. Aedeagus long with the basal half dilated, narrowing to form a slender, upcurved, distal portion with the tip split into two rounded lobes.

♀. Not known.

L. bergeri differs from *durbania* on the upperside by the ground colour which in *durbania* tends to be more tawny; also the costal stripe of *bergeri* is narrower than that of *durbania*, and the apical patch is less extensive. On the underside the oblique stripe arising from the costa at the end of the discoidal cell is narrower in *bergeri*.

MATERIAL EXAMINED.

Holotype ♂, ZAIRE: 'Kafakumba (KATANGA), iv.1929, *F. G. Overlaet*', Stempffer dissection no. 3592. In the MRAC, Tervuren. This is the only specimen known at present.

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FRANCE

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WYNDRUSH
MILL LANE
WINGRAVE
AYLESBURY
BUCKINGHAMSHIRE

MISS S. J. MAY
21 WALTON TERRACE
AYLESBURY
BUCKINGHAMSHIRE

PLATE 1

Fig. 1. *Liptena opaca opaca* ♂ lectotype, upperside. BMNH Neg. No. 55690.
Fig. 2. *Liptena opaca gabunica* ♂ holotype, upperside. BMNH Neg. No. 55692.
Fig. 3. *Liptena opaca centralis* ♂ holotype, upperside. BMNH Neg. No. 55694.
Fig. 4. *Liptena opaca opaca* ♂ lectotype, underside. BMNH Neg. No. 55691.
Fig. 5. *Liptena opaca gabunica* ♂ holotype, underside. BMNH Neg. No. 55693.
Fig. 6. *Liptena opaca centralis* ♂ holotype, underside. BMNH Neg. No. 55695.
Fig. 7. *Liptena opaca ugandana* ♂ holotype, upperside. BMNH Neg. No. 55696.
Fig. 8. *Liptena opaca sankuru* ♂ holotype, upperside. BMNH Neg. No. 55698.
Fig. 9. *Liptena albomacula* ♂ holotype, upperside. BMNH Neg. No. 55701.
Fig. 10. *Liptena opaca ugandana* ♂ holotype, underside. BMNH Neg. No. 55697.
Fig. 11. *Liptena opaca sankuru* ♂ holotype, underside. BMNH Neg. No. 55699.
Fig. 12. *Liptena albomacula* ♂ holotype, underside. BMNH Neg. No. 55700.
Fig. 13. *Liptena titei* ♂ holotype, upperside. BMNH Neg. No. 55702.
Fig. 14. *Liptena griveaudi* ♂, upperside. BMNH Neg. No. 55704.
Fig. 15. *Liptena confusa* ♀, upperside. BMNH Neg. No. 55707.
Fig. 16. *Liptena titei* ♂ holotype, underside. BMNH Neg. No. 55703.
Fig. 17. *Liptena griveaudi* ♂, underside. BMNH Neg. No. 55705.
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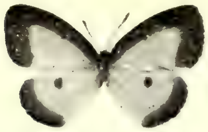
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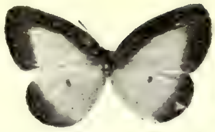
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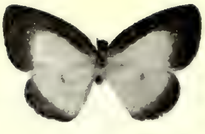
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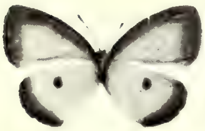
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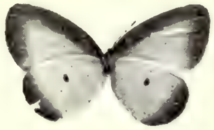
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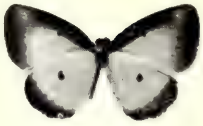
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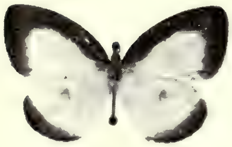
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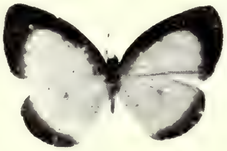
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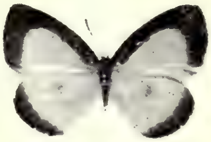
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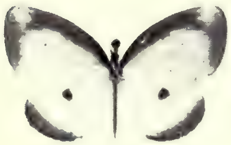
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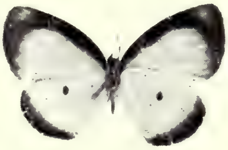
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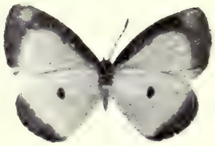
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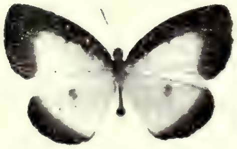
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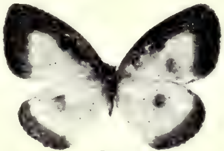
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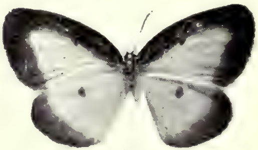
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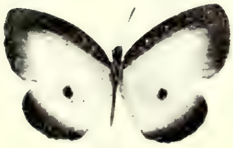
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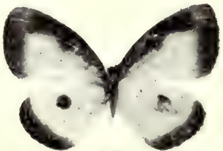
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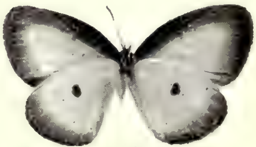
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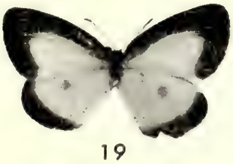
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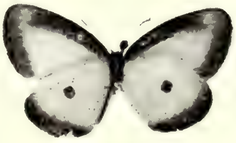
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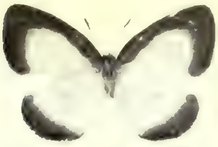
PLATE 2

FIG. 21. *Liptena submacula submacula* ♂ neallotype, upperside. BMNH Neg. No. 55710.
FIG. 22. *Liptena submacula tringa* ♂ holotype, upperside. BMNH Neg. No. 55712.
FIG. 23. *Liptena submacula maesseni* ♂, upperside. BMNH Neg. No. 55714.
FIG. 24. *Liptena submacula submacula* ♂ neallotype, underside. BMNH Neg. No. 55711.
FIG. 25. *Liptena submacula tringa* ♂ holotype, underside. BMNH Neg. No. 55713.
FIG. 26. *Liptena submacula maesseni* ♂, underside. BMNH Neg. No. 55715.
FIG. 27. *Liptena submacula liberiana* ♂ holotype, upperside. BMNH Neg. No. 55716.
FIG. 28. *Liptena fatima* ♂, normal specimen, upperside. BMNH Neg. No. 55718.
FIG. 29. *Liptena fatima* ♂, lightly marked specimen, upperside. BMNH Neg. No. 55720.
FIG. 30. *Liptena submacula liberiana* ♂ holotype, underside. BMNH Neg. No. 55717.
FIG. 31. *Liptena fatima* ♂, normal specimen, underside. BMNH Neg. No. 55719.
FIG. 32. *Liptena fatima* ♂, lightly marked specimen, underside. BMNH Neg. No. 55721.
FIG. 33. *Liptena albicans* ♂ holotype, upperside. BMNH Neg. No. 55722.
FIG. 34. *Liptena alluaudi* ♂, upperside. BMNH Neg. No. 55724.
FIG. 35. *Liptena batesana* ♂, upperside. BMNH Neg. No. 55726.
FIG. 36. *Liptena albicans* ♂ holotype, underside. BMNH Neg. No. 55723.
FIG. 37. *Liptena alluaudi* ♂, underside. BMNH Neg. No. 55725.
FIG. 38. *Liptena batesana* ♂, underside. BMNH Neg. No. 55727.
FIG. 39. *Liptena* sp. (see p. 139). ♂ specimen from Oban, upperside. BMNH Neg. No. 55730.
FIG. 40. *Liptena* sp. (see p. 139). ♂ specimen from Oban, underside. BMNH Neg. No. 55731.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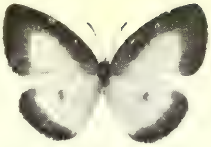
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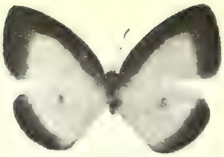
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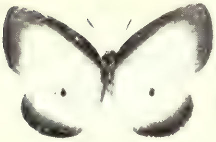
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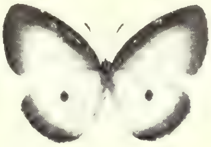
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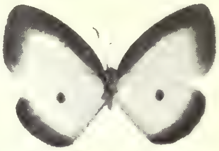
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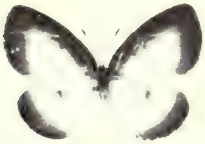
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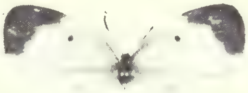
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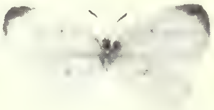
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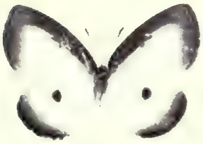
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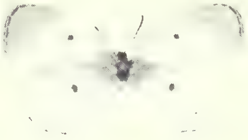
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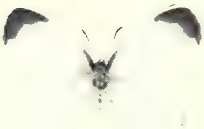
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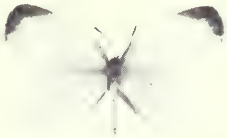
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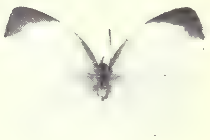
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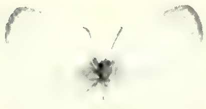
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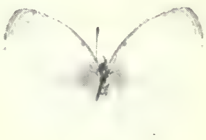
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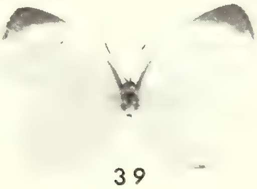
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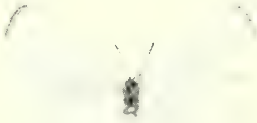
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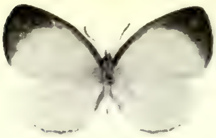
PLATE 3

FIG. 41. *Liptena augusta* ♂ neotype, upperside. BMNH Neg. No. 55728.
FIG. 42. *Liptena ilaro* ♂ holotype, upperside. BMNH Neg. No. 55732.
FIG. 43. *Liptena simplicia* ♂, upperside. BMNH Neg. No. 55734.
FIG. 44. *Liptena augusta* ♂ neotype, underside. BMNH Neg. No. 55729.
FIG. 45. *Liptena ilaro* ♂ holotype, underside. BMNH Neg. No. 55733.
FIG. 46. *Liptena simplicia* ♂, underside. BMNH Neg. No. 55735.
FIG. 47. *Liptena simplicia* f. *semilimbata* ♂, upperside. BMNH Neg. No. 55736.
FIG. 48. *Liptena bassae* ♂ holotype, upperside. BMNH Neg. No. 55738.
FIG. 49. *Liptena tiassale* ♂ paratype, upperside. BMNH Neg. No. 55740.
FIG. 50. *Liptena simplicia* f. *semilimbata* ♂, underside. BMNH Neg. No. 55737.
FIG. 51. *Liptena bassae* ♂ holotype, underside. BMNH Neg. No. 55739.
FIG. 52. *Liptena tiassale* ♂ paratype, underside. BMNH Neg. No. 55741.
FIG. 53. *Liptena hapale* ♂ neallotype, upperside. BMNH Neg. No. 55742.
FIG. 54. *Liptena decipiens decipiens* ♀ lectotype, upperside. BMNH Neg. No. 55744.
FIG. 55. *Liptena decipiens leucostola* ♂, upperside. BMNH Neg. No. 55746.
FIG. 56. *Liptena hapale* ♂ neallotype, underside. BMNH Neg. No. 55743.
FIG. 57. *Liptena decipiens decipiens* ♀ lectotype, underside. BMNH Neg. No. 55745.
FIG. 58. *Liptena decipiens leucostola* ♂, underside. BMNH Neg. No. 55747.
FIG. 59. *Liptena decipiens etoumbi* ♂ holotype, upperside. BMNH Neg. No. 55748.
FIG. 60. *Liptena decipiens etoumbi* ♂ holotype, underside. BMNH Neg. No. 55749.



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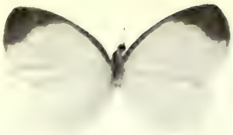

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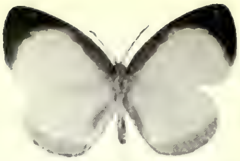

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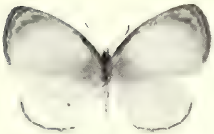

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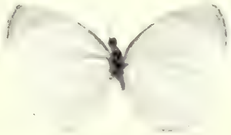

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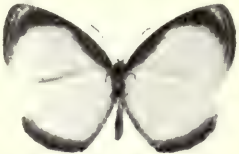

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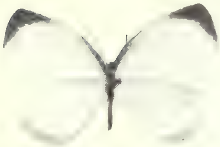

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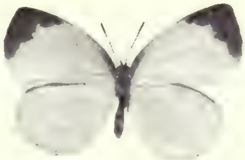

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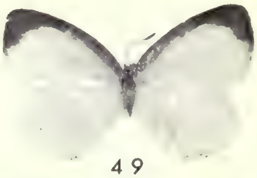

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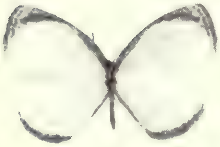

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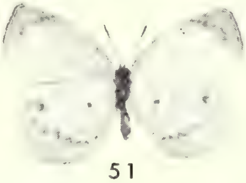

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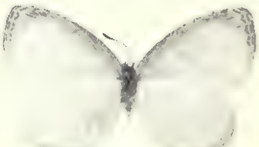

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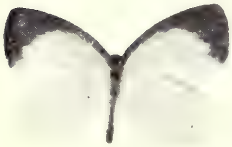

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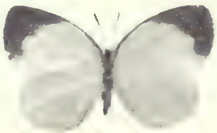

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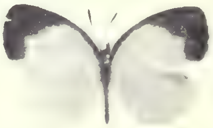

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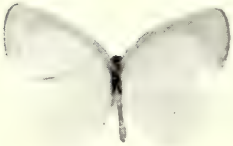

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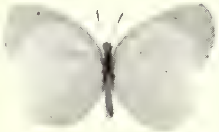

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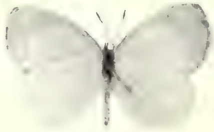

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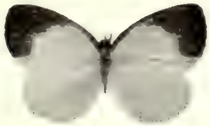

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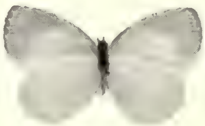

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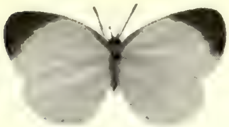
PLATE 4

Fig. 61. *Liptena pearmani* ♂ holotype, upperside. BMNH Neg. No. 55750.
Fig. 62. *Liptena inframacula* ♀ neallotype, upperside. BMNH Neg. No. 55752.
Fig. 63. *Liptena septistrigata* ♂ neallotype, upperside. BMNH Neg. No. 55758.
Fig. 64. *Liptena pearmani* ♂ holotype, underside. BMNH Neg. No. 55751.
Fig. 65. *Liptena inframacula* ♀ neallotype, underside. BMNH Neg. No. 55753.
Fig. 66. *Liptena septistrigata* ♂ neallotype, underside. BMNH Neg. No. 55759.
Fig. 67. *Liptena undularis* ♂ neallotype, upperside. BMNH Neg. No. 55754.
Fig. 68. *Liptena ferrymani ferrymani* ♀ neallotype, upperside. BMNH Neg. No. 55756.
Fig. 69. *Liptena undularis* ♂ neallotype, underside. BMNH Neg. No. 55755.
Fig. 70. *Liptena ferrymani ferrymani* ♀ neallotype, underside. BMNH Neg. No. 55757.
Fig. 71. *Liptena subundularis* ♂ lectotype, upperside. BMNH Neg. No. 55760.
Fig. 72. *Liptena nigromarginata* ♂ holotype, upperside. BMNH Neg. No. 55762.
Fig. 73. *Liptena subsuffusa* ♂ holotype, upperside. BMNH Neg. No. 55764.
Fig. 74. *Liptena subundularis* ♂ lectotype, underside. BMNH Neg. No. 55761.
Fig. 75. *Liptena nigromarginata* ♂ holotype, underside. BMNH Neg. No. 55763.
Fig. 76. *Liptena subsuffusa* ♂ holotype, underside. BMNH Neg. 55765.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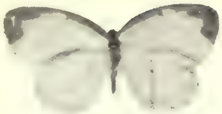
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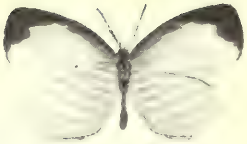
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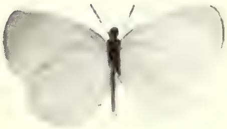
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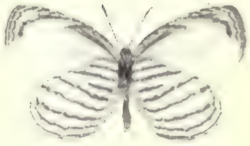
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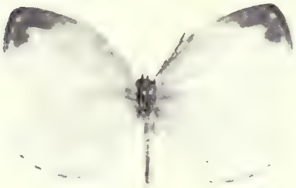
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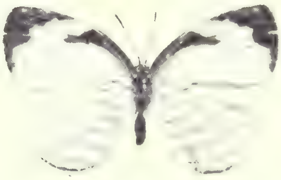
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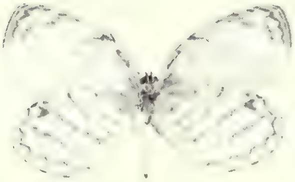
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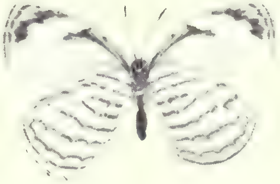
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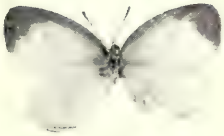
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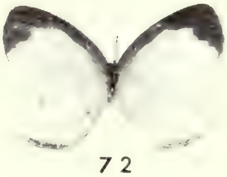
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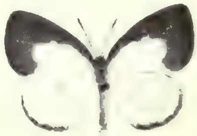
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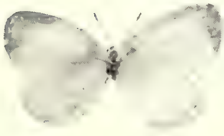
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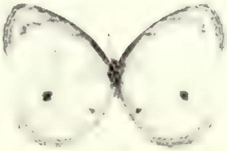
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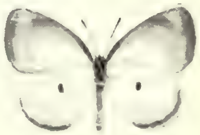
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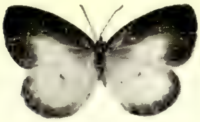
PLATE 5

Fig. 77. *Liptena perobscura* ♂ neallotype, upperside. BMNH Neg. No. 55766.
Fig. 78. *Liptena ochrea* ♂ neallotype, upperside. BMNH Neg. No. 55768.
Fig. 79. *Liptena bolivari* ♀ neallotype, upperside. BMNH Neg. No. 55796.
Fig. 80. *Liptena perobscura* ♂ neallotype, underside. BMNH Neg. No. 55767.
Fig. 81. *Liptena ochrea* ♂ neallotype, underside. BMNH Neg. No. 55769.
Fig. 82. *Liptena bolivari* ♀ neallotype, underside. BMNH Neg. No. 55797.
Fig. 83. *Liptena evanescens* ♂ holotype, upperside. BMNH Neg. No. 55794.
Fig. 84. *Liptena evanescens* (f. '*immaculata*'), upperside. BMNH Neg. No. 55788.
Fig. 85. *Liptena evanescens* from Nigeria ♂, upperside. BMNH Neg. No. 55786.
Fig. 86. *Liptena evanescens* ♂ holotype, underside. BMNH Neg. No. 55795.
Fig. 87. *Liptena evanescens* (f. '*immaculata*'), underside. BMNH Neg. No. 55789.
Fig. 88. *Liptena evanescens* from Nigeria ♂, underside. BMNH Neg. No. 55787.
Fig. 89. *Liptena undina* ♂, upperside. BMNH Neg. No. 55770.
Fig. 90. *Liptena xanthostola xanthostola* ♂, upperside. BMNH Neg. No. 55792.
Fig. 91. *Liptena xanthostola xantha* ♂, upperside. BMNH Neg. No. 55798.
Fig. 92. *Liptena undina* ♂, underside. BMNH Neg. No. 55771.
Fig. 93. *Liptena xanthostola xanthostola* ♂, underside. BMNH Neg. No. 55793.
Fig. 94. *Liptena xanthostola xantha* ♂, underside. BMNH Neg. No. 55799.
Fig. 95. *Liptena overlaeti* ♂ holotype, upperside.
Fig. 96. *Liptena overlaeti* ♂ holotype, underside.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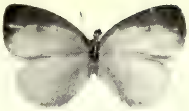
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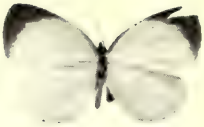
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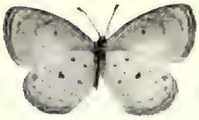
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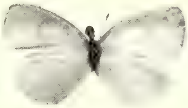
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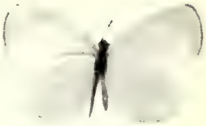
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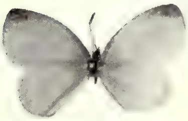
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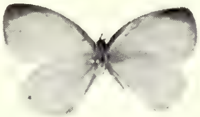
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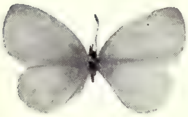
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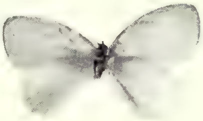
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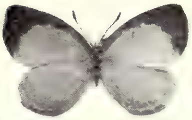
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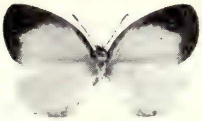
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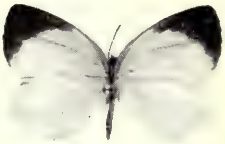
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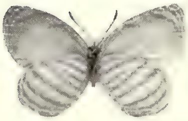
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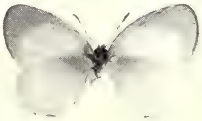
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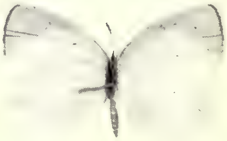
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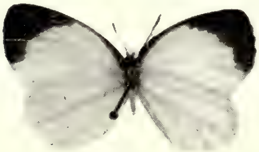
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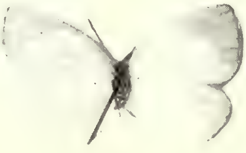
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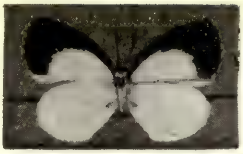
PLATE 6

FIG. 97. *Liptena fontainei* ♂ holotype, upperside.
FIG. 98. *Liptena homeyeri* ♂, upperside. BMNH Neg. No. 55778.
FIG. 99. *Liptena homeyeri* ♂, underside. BMNH Neg. No. 55779.
FIG. 100. *Liptena homeyeri straminea* ♂ holotype, upperside. BMNH Neg. No. 55780.
FIG. 101. *Liptena homeyeri straminea* ♂ holotype, underside. BMNH Neg. No. 55781.
FIG. 102. *Liptena rochei* ♂, upperside. BMNH Neg. No. 55776.
FIG. 103. *Liptena flavicans praeusta* ♂ lectotype, upperside. BMNH Neg. No. 55784.
FIG. 104. *Liptena durbania* ♂ holotype, upperside. BMNH Neg. No. 55782.
FIG. 105. *Liptena rochei* ♂, underside. BMNH Neg. No. 55777.
FIG. 106. *Liptena flavicans praeusta* ♂ lectotype, underside. BMNH Neg. No. 55785.
FIG. 107. *Liptena durbania* ♂ holotype, underside. BMNH Neg. No. 55783.



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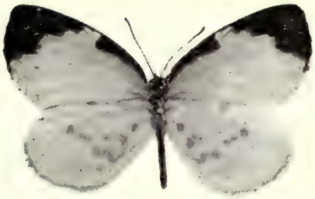

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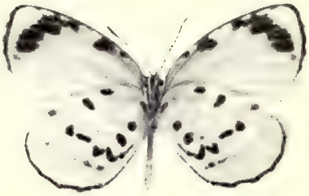

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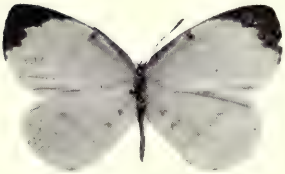

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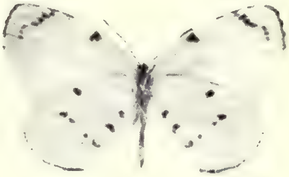

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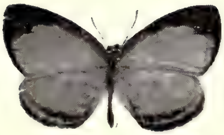

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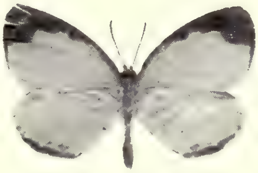

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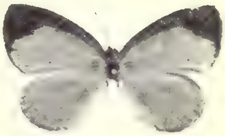

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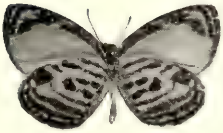

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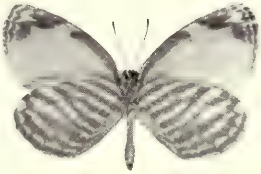

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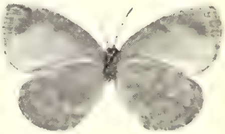

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A CATALOGUE OF THE FAMILY-GROUP AND GENUS-GROUP NAMES OF THE COLEOPHORIDAE (LEPIDOPTERA)

K. SATTLER
AND
W. G. TREMEWAN

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 30 No. 3
LONDON : 1974

BRITISH MUSEUM
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NATURAL HISTORY

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BY
KLAUS SATTLER K
AND
WALTER GERALD TREMEWAN A/E

Pp. 183–214

BULLETIN OF
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ENTOMOLOGY Vol. 30 No. 3
LONDON : 1974

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A CATALOGUE OF THE FAMILY-GROUP AND GENUS-GROUP NAMES OF THE COLEOPHORIDAE (LEPIDOPTERA)

By K. SATTLER & W. G. TREMEWAN

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SYNOPSIS

All the family-group and genus-group names (including variations in spelling) of the Coleophoridae are listed alphabetically; also included is the recently separated family Parametriotidae. Citations of type-species are given, together with bibliographical references to the original descriptions and subsequent designations of type-species. The recent classifications of the Coleophoridae by Căpuşe and Falkovitsh are discussed. Fifty-four new synonymies are introduced (2 subfamilies, 8 tribes, 1 subtribe, 42 genera).

INTRODUCTION

THE following catalogue contains the family-group and genus-group names of the lepidopterous family Coleophoridae, i.e. genera which are currently placed in that family, genera which were originally described in the Coleophoridae but subsequently transferred to other families, and genera which, although neither described nor currently placed in the Coleophoridae, were temporarily associated with that family by some authors. Also included is the family Parametriotidae which was recently separated from the Coleophoridae. The type-species of each genus is given, including its original reference, and the mode of its fixation is stated, i.e. by original designation, monotypy, or subsequent designation. Subsequent incorrect type-designations are discussed in the most important instances only.

Under the *International Code of Zoological Nomenclature*, Article 70 (a), the case of a misidentified type-species has to be referred to the International Commission on Zoological Nomenclature. In the case of *Aureliania* Căpuşe, 1971, the Commission should be asked to designate formally as the type-species *Coleophora annulatella* Nylander, 1848, the nominal species actually involved.

Each generic name has been checked for homonymy in the catalogues of Neave (1939–66, *Nomencl. zool.* **1–6**). All senior homonyms have been checked in the original literature for validity and spelling.

Names that have been proposed expressly to replace junior homonyms, and junior objective synonyms that have been used for the same purpose, are referred to in this catalogue as objective replacement names.

Subjective synonymy of the genera is not discussed in detail; however, the present status of each genus is recorded. Unless stated otherwise, the genus-group names were originally proposed in the Coleophoridae (Coleophorae, Coleophorinae).

All references have been checked personally by the authors. To establish the correct date of publication, the following evidence has been taken into consideration: original wrappers and distribution lists of journals, special publications on the works of certain authors, and the publications of the International Commission on Zoological Nomenclature. In all instances the original publications were examined because reprints sometimes differ in date of publication and in pagination. The printed date of publication in a book or journal is accepted as correct, unless there exists published evidence to the contrary.

Family-group and genus-group names are listed in separate sections. All names are arranged in alphabetical order; homonyms, synonyms and unavailable names are cross-referenced. Junior homonyms, junior objective synonyms, and unavailable names (nomina nuda and rejected names) are in non-bold italics; unavailable names are marked with a double dagger (‡). The alphabetical entries of all other generic names are in bold italics, as are the names of their type-species. All genus-group names which currently are not placed in the Coleophoridae are marked with an asterisk(*).

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THE CLASSIFICATION OF THE COLEOPHORIDAE BY CĂPUŞE (1971; 1972) AND FALKOVITSH (1972)

Species of Coleophoridae were placed by early authors in the composite genus *Tinea* which at that time comprised the majority of the Microlepidoptera. Hübner (1825) divided *Tinea* into a number of 'Stirpes' ('Stirps' being the equivalent of the family of modern authors), one of the which he named 'Coleophorae'. Bruand (1850) referred to that group as 'Tribus Coleophoridae'. Subsequently, Stainton

(1854), Heinemann & Wocke (1876), Spuler (1910) and many other authors recognized the Coleophoridae as a family. Some authors treated the group as subfamily Coleophorinae of the Tineidae (Kusnezov, 1916; Handlirsch, 1924; Janse, 1932), Elachistidae (Walsingham, 1897; Rebel, 1901), Momphidae (Börner, 1920) and Scythrididae (Börner, 1938); however, in recent years the status of the Coleophoridae as a family has been undisputed.

In the European Coleophoridae, Heinemann & Wocke (1876) recognized the three genera *Metriotes* Herrich-Schäffer, *Coleophora* Hübner (erroneously attributed to Zeller) and *Goniodoma* Zeller, and this has been widely accepted by subsequent authors. Further genera were described from Asia and North and South Africa. Toll (1953) transferred the genus *Augasma* Herrich-Schäffer to the Coleophoridae. *Augasma* was originally described in the Tineidae and subsequently placed in the Augasmidae (Heinemann & Wocke, 1876), Elachistidae: Momphinae (Rebel, 1901) and Heliodinidae (Spuler, 1910).

The Asiatic genus *Parametriotes* Kusnezov was removed from the Coleophoridae and placed in the separate family Parametriotidae Căpuşe (1971 : 55). We have not ascertained the validity of the family Parametriotidae but agree with Căpuşe that the genus *Parametriotes* should be excluded from the Coleophoridae.

The genus *Coleophora* has always been considered a homogeneous group of species and was merely subdivided into species-groups by past workers (Zeller, 1849; Heinemann & Wocke, 1876; Toll, 1953–1962). However, in three recent papers (Căpuşe, 1971; 1972; Falkovitsh, 1972) *Coleophora* was divided into a large number of genera and even into tribes and subfamilies. The division of *Coleophora* in such a manner is contrary to what was the universally accepted concept of that genus. Consequently we have examined the evidence of Căpuşe and Falkovitsh.

Căpuşe's work is based on Palaearctic species, and those he has studied represent 15–20 per cent. of the known world fauna of the Coleophoridae (currently estimated at approximately 1000 species). The first part of Căpuşe's 1971 paper (pp. 14–54) deals with the morphology of the imago (pp. 14–51), the pupa (pp. 51–52) and the larva (pp. 52–54). The second part (pp. 55–66) deals with the taxonomy of the Coleophoridae. Here Căpuşe has divided the family into three subfamilies (one of them new) with six tribes (five of them new) and 32 genera (19 of them new, most of the others brought back into use out of synonymy). The work is supplemented by 46 plates illustrating the morphology (head capsules, mouth parts, wing venation, legs, male and female genitalia).

The genera as recognized by Căpuşe are poorly defined and based on characters many of which we find unacceptable at the generic level. In the descriptions of the taxa, Căpuşe frequently refers to the morphological section of his paper. Although some aspects of the morphology of the imago are discussed in great detail we consider that much of this is irrelevant as far as the widely accepted concept of a genus is concerned. To quote only one example: in describing the legs (pp. 31–33) Căpuşe states that with regard to the hind legs '. . . the medial pair of spurs arises at approximately 0·56–0·76 of the length of the metatibia', over half a page being devoted to listing mostly differences of 0·01 between species. As Căpuşe states that the figures quoted for the relative position of the medial spurs are approximate, differences of 0·01 are meaningless. Quantitative characters (numbers or proportions of segments of antennae, labial palpi, maxillary palpi) are often unreliable because they can be subject to individual variation or differ in closely related species. For example, differences in the number of segments and their proportions are found in the maxillary and labial palpi of closely related species of *Ethmia* Hübner (Sattler, 1967).

Căpuşe's descriptions of new genera are often extraordinarily brief. For example, the description of *Amseliphora* consists of a citation of the type-species and a sentence which reads in English translation:

'The morphological characters, of which a detailed description is given in the respective preceding pages, individualize and characterize our genus.'

The name *Amseliphora* (or that of any other new genus) is not mentioned in the 'preceding pages', and to find that 'detailed description' one has to wade through the entire morphological section (pp. 14–54) where, in this case, the type-species *C. niveicostella* Zeller is mentioned on at least 15 different pages. What one then finds has mostly no significance or value at the generic level (e.g. number of antennal segments – a character which is often variable within a species – number of segments of maxillary palpi, length of the galeae, shape of the gnathos arm).

Căpuşe has not compared in detail any of the genera with related genera. No keys are provided and it is therefore impossible to associate by an accepted scientific method a given species with its appropriate genus. Although Căpuşe, in his morphological section, discussed between 150 and 200 species, in the taxonomic section only about 80 are placed in genera. The generic position of the remaining species was not determined by Căpuşe. The plate legends and a footnote on p. 66 indicate that they should not automatically be referred to *Coleophora* s. str.

Apart from the scientific content of Căpuşe's paper, its presentation leaves much to be desired. The descriptions of new genera are not always followed by a complete list of the included species; in several cases, species have been newly associated with genera only in the plate legends. No new combinations have been marked as such. In view of the many species mentioned throughout the paper an index to the species would have been desirable.

Căpuşe (p. 51) reaches the following conclusion (translated from the French):

'The morphology of the male and female genitalia, likewise the other characters, show the heterogeneity of the genus *Coleophora* Hbn.; and the false impression of resemblance is due to parallelisms and methods of preparation; from the preceding pages it follows that the artificial character of this genus is richly illustrated. Due to the inclusion without discrimination of newly discovered species in the genus *Coleophora* Hbn., this genus encompasses phyletic lines of different origins, the classification of the species being artificial. The situation of the genus *Coleophora* Hbn. is at present similar to that of the former genus *Tinea* L.'

To us, the morphological characters studied by Căpuşe (head structures, mouth parts, wing patterns and venation, legs, male and female genitalia) do not demonstrate the heterogeneity of the genus *Coleophora* but on the contrary indicate that the genus is a homogeneous group. Căpuşe alleges parallel development of structures but does not cite specific examples; we have not been able to find any evidence of parallel development. Furthermore, it seems unlikely that methods of preparation (presumably of the genitalia?) would cause superficial resemblance of otherwise distinct structures; rather the opposite is often found when different methods of preparation cause differences to appear where none in fact exist. The characters discussed by Căpuşe in the morphological section do not illustrate the artificial character of the genus *Coleophora* but clearly demonstrate in many instances gradual transition from one extreme to another. Căpuşe's statement that the genus *Coleophora* unites phyletic lines of different origin is not supported by any concrete examples and in our opinion is without foundation. We have been unable to find any characters which suggest that the species of the genus *Coleophora* have evolved from more than one common ancestor. The species included in *Coleophora* s. l. share a number of important characters, for example, the simple frenulum in the female, the groups of spines on the abdominal tergites, the reduced uncus, the globular, fused gnathos bearing 'androconial' scales, the membranous aedeagus with supporting sclerotized rods, the spines of the posterior part of the ductus bursae, the basic shape of the signum, the position of the moth at rest with the antennae directed forward, and the case-making and leaf-mining habits of the larva. The importance of these characters, which indicate to us the close relationship of the included species, is not diminished by the fact that some have undergone extreme development in certain species.

In a second paper, Căpuşe (1972) erected the genus *Falkovitshia* for a new species *marcella*, described from a single male from Central Asia. In the same paper he erected the subfamily Falkovitshiinae and the tribe Falkovitshiini to accommodate *Falkovitshia marcella*, at the same time proposing the subfamily Tolleophorinae to accommodate the previously described tribe Tolleophorini Căpuşe, and *Tolleophora asthenella* (Constant). The new genus, new tribe and two new subfamilies are poorly defined and based on characters which are not acceptable at the generic or suprageneric level.

Continuing along similar lines, Falkovitsh (1972) recognizes Căpuşe's work, enlarges upon it and adds one new tribe, two new subtribes, 16 new genera and four new subgenera to the taxa separated by Căpuşe; one objective replacement name was also introduced. In contrast to Căpuşe's paper, that by Falkovitsh is clearly presented. The characters which are used for separating the genera are examined for each genus and presented in a uniform manner. However, we find most of the characters unacceptable at the generic level; they are no more than differences between species. These characters include, for example, length of palpi and proboscis, fore wing coloration, shape of sacculus and cornutus, and shape and sclerotization of ostium bursae. Other characters which have proved significant in some lepidopterous families were found to be of little generic value in the Coleophoridae. We find it impossible to divide the Coleophoridae into well defined units based on the wing venation, which shows considerable variability.

Falkovitsh has not compared in detail any of the new genera with related genera and it is not clear which characters he considers to be most significant. As the paper also lacks a key to the genera it is impossible to place by an accepted scientific method a given species in its appropriate genus.

Falkovitsh erected the genus *Perygra* and subdivided it into three subgenera. He associated *adjunctella* and *agramella* with *Perygra*, but stated that owing to lack of material he was unable to place either of these species in any of the subgenera, even suggesting that a new subgenus might be required to accommodate them. We find it difficult to understand why he was able to include those species in *Perygra* but at the same time was unable to place them in a subgenus.

The division of *Coleophora* into genera as proposed by Căpuşe and Falkovitsh deviates from the concept which currently is widely accepted for genera in the Microlepidoptera. This can be seen by comparing the Coleophoridae with recent generic revisions in the Tineidae, Yponomeutidae, Oecophoridae, Ethmiidae, Gelechiidae, Cochylidae and Crambidae. To our knowledge there is no other genus in the Microlepidoptera which has been subjected to such a drastic degree of splitting. By following the principles of Căpuşe and Falkovitsh the concept of a genus would be changed to such an extent that its purpose would be lost. The introduction of a genus-group name should indicate major divisions, without transitions, between groups of species, and a genus should therefore be clearly identifiable. This is not the case in the work of Căpuşe and Falkovitsh.

The genus *Coleophora* as recognized by previous authors is divided by Căpuşe and Falkovitsh into 3 subfamilies, 7 tribes with 2 subtribes, and 44 genera of which two were each subdivided into 3 subgenera. This arrangement takes into consideration only about 130 out of approximately 1000 species of the genus *Coleophora*. Assuming that such studies of the remaining species would produce a comparable number of 'genera', the present genus *Coleophora* would be split into 330 genera.

It can be argued that for practical purposes the division of a large genus might be desirable, and we are aware that the genus *Coleophora* with approximately 1000 species is perhaps a little unwieldy. However, until now, all specialists have been content to subdivide the genus merely into species-groups or sections; for example Toll (1953; 1962), who based his classification mainly on the study of the male and female genitalia of over 500 out of an estimated 600 Palaearctic species.

The generic divisions of Căpuşe and Falkovitsh are for the greater part not based on previously overlooked characters but mainly on a reassessment of those which had already been considered by earlier authors. Many of the genera recognized by Căpuşe and Falkovitsh do not differ from the divisions of Toll (1962), for example, *Casas* Wallengren (= group 1 of Toll), *Tolleophora* Căpuşe (= group 2, section 1 of Toll), *Haploptilia* Hübner (= group 2, section 10, subsection 1 of Toll), *Orghidania* Căpuşe (= group 2, section 4 of Toll), *Frederickoenigia* Căpuşe (= group 2, section 5 of Toll), *Suireia* Căpuşe (= group 2, section 7 of Toll), *Zagulajevia* Căpuşe (=group 7, section 2, subsection 2 of Toll), *Glaseria* Căpuşe (= group 9, section 3 of Toll), *Helopharea* Falkovitsh and *Cricotechna* Falkovitsh (= group 2, section 12, subsection 3 of Toll), and *Aporiptura* Falkovitsh (= group 8, section 1 of Toll). Group 34 of Toll (1953), which comprises a number of closely allied species, characterized by the pointed gnathos in the male genitalia, was considered a separate tribe Carpochenini Falkovitsh (= Heringiellini Căpuşe) and divided into the genera *Heringiella* Börner, *Ionescumia* Căpuşe and *Stollia* Căpuşe. Such application of genus, tribe or subfamily names to Toll's species-groups adds nothing to our knowledge of the Coleophoridae.

As a result of our research we have decided to synonymize with *Coleophora* the genera described or resurrected by Căpuşe and Falkovitsh (see pp. 196–208). It is possible that some of the genera which we recognize in this paper may also eventually prove to be synonymous with *Coleophora*, e.g. *Ischnophanes* Meyrick. It follows that if there is no necessity for those genera, then higher taxa such as subtribes, tribes and subfamilies are even more superfluous.

The subfamilies Metriotinae and Augasminae and the tribe Coleophorinae: Ischnophanini are based on genera which are currently considered to be valid. However, those genera are morphologically so similar to *Coleophora* that their separation as subfamilies or tribes is unjustified.

During the course of our research we have found the work of Mayr (1969) particularly useful as it expresses, in a clear and comprehensive way, the requirements of modern taxonomic publications.

CHECK-LIST OF COLEOPHORIDAE AND PARAMETRIOTIDAE FOLLOWING CĂPUŞE (1971; 1972)

The following check-list contains the names of the taxa dealt with by Căpuşe (1971; 1972). The arrangement of the subfamilies, tribes and genera mainly follows his 1971 paper, but the species are here arranged alphabetically within each genus, as, in several cases, they were newly associated with genera only in the plate legends. No corrections have been made where Căpuse associated species names with wrong authors.

- PARAMETRIOTIDAE Căpuşe, 1971
    - *Parametriotes* Kusnezov, 1915
        - *P. theae* Kusnezov, 1915
- COLEOPHORIDAE Hübner, 1825
    - METRIOTINAE Căpuşe, 1971
        - *Metriotes* Herrich-Schäffer, 1853
            - *M. modestella* (Duponchel)
    - AUGASMINAE Heinemann & Wocke, 1877
        - *Augasma* Herrich-Schäffer, 1853
            - *A. aeratella* (Zeller)
    - TOLLEOPHORINAE Căpuşe, 1972
        - TOLLEOPHORINI Căpuşe, 1971
            - *Tolleophora* Căpuşe, 1971
                - *T. asthenella* (Constant)
    - COLEOPHORINAE Hübner, 1825
        - ISCHNOPHANINI Căpuşe, 1971
            - *Ischnophanes* Meyrick, 1891
                - *I. monocentra* Meyrick
        - CASASINI Căpuşe, 1971
            - *Casas* Wallengren, 1881
                - *C. amasicola* (Toll)
                - *C. crepidinella* (Zeller)
                - *C. leucapennella* (Hübner)
                - *C. syriaca* (Toll)
                - *C. zernyi* (Toll)

HERINGIELLINI Căpuşe, 1971
- *Heringiella* Börner, 1944
  - *H. squalorella* (Zeller)
- *Ionescumia* Căpuşe, 1971
  - *I. clypeiferella* (Hofmann)
  - *I. pilicornis* (Rebel)
- *Stollia* Căpuşe, 1971
  - *S. binotapennella* (Duponchel)
  - *S. griseicornella* (Toll)
  - *S. grisescens* (Toll)
  - *S. orotavensis* (Rebel)
  - *S. palaestinella* (Toll)
  - *S. preisseckeri* (Toll)
  - *S. salicorniae* (Heinemann & Wocke)
  - *S. unipunctella* (Zeller)
  - *S. weymarni* (Toll)

RAZOWSKIINI Căpuşe, 1971
- *Razowskia* Căpuşe, 1971
  - *R. coronillae* (Zeller)
  - *R. flaviella* (Mann)
  - *R. hafneri* (Prohaska)

COLEOPHORINI Hübner, 1825
- *Coleophora* Hübner, 1822
  - *C. albidella* (Herrich-Schäffer)
  - *C. anatipennella* (Hübner)
  - *C. betulella* Heinemann & Wocke
  - *C. currucipennella* Zeller
  - *C. ibipennella* Zeller
  - *C. nemorum* Heinemann
  - *C. palliatella* (Zincken)
- *Eupista* Hübner, 1825
  - *E. ornatipennella* (Hübner)
- *Apista* Hübner, 1825
  - *A. gallipennella* (Hübner)
- *Haploptilia* Hübner, 1825
  - *H. fuscedinella* (Zeller)
  - *H. kroneella* (Fuchs)
  - *H. prunifoliae* (Doets)
  - *H. pseudoprunifoliae* (Căpuşe)
  - *H. serratella* (Linnaeus)
- *Orghidania* Căpuşe, 1971
  - *O. gryphipennella* (Bouché)
- *Frederickoenigia* Căpuşe, 1971
  - *F. flavipennella* (Herrich-Schäffer)
- *Suireia* Căpuşe, 1971
  - *S. alnifoliae* (Barasch)
  - *S. badiipennella* (Duponchel)
  - *S. limosipennella* (Duponchel)
  - *S. milvipennis* (Zeller)
- *Zagulajevia* Căpuşe, 1971
  - *Z. gerasimovi* (Toll)
  - *Z. kuznetzovi* (Toll)
  - *Z. tadzhikiella* (Danilevski)

Amseliphora Căpuşe, 1971
  A. bilineatella (Zeller)
  A. niveicostella (Zeller)
Nemesia Căpuşe, 1971
  N. chalcogrammella (Zeller)
Zangheriphora Căpuşe, 1971
  Z. laricella (Hübner)
Bourgogneja Căpuşe, 1971
  B. gallurella (Amsel)
  B. gogovi (Căpuşe)
  B. onosmella (Brahm)
  B. skopusella (Amsel)
Aureliania Căpuşe, 1971
  A. flavaginella Zeller sensu Căpuşe
    [= *annulatella* Nylander]
  A. laripennella (Zetterstedt)
  A. sternipennella (Zetterstedt)
  A. therinella (Tengström)
  A. versurella (Zeller)
  A. virgaureae (Stainton)
Bacescuia Căpuşe, 1971
  B. moeniacella (Stainton)
Casigneta Wallengren, 1881
  C. millefolii (Zeller)
Klinzigedia Căpuşe, 1971
  K. onopordiella (Zeller)
  K. phlomidella (Christoph)
  K. phlomidis (Stainton)
  K. wockeella (Zeller)
Vladdelia Căpuşe, 1971
  V. niveistrigella (Wocke)
Klimeschja Căpuşe, 1971
  K. oriolella (Zeller)
Glaseria Căpuşe, 1971
  G. biseriatella (Staudinger)
Valvulongia Căpuşe, 1971
  V. falcigerella (Christoph)
Damophila Curtis, 1832
  D. alcyonipennella (Kollar)
  D. cuprariella (Zeller)
  D. deauratella (Zeller)
  D. frischella (Linnaeus)
  D. spissicornis (Haworth)
Enscepastra Meyrick, 1920
  E. plagiopa Meyrick
Goniodoma Zeller, 1849
  G. auroguttella Zeller
FALKOVITSHIINAE Căpuşe, 1972
 FALKOVITSHIINI Căpuşe, 1972
  Falkovitshia Căpuşe, 1972
    F. marcella Căpuşe

CHECK-LIST OF COLEOPHORIDAE FOLLOWING FALKOVITSH (1972)

The following check-list contains the names of the taxa dealt with by Falkovitsh (1972). The arrangement of the tribes, subtribes, genera and subgenera follows his paper while the species are here arranged alphabetically within the genus.

COLEOPHORINI Hübner, 1825
  AGAPALSINA Falkovitsh, 1972
    Helopharea Falkovitsh, 1972
      H. ledi (Stainton)
      H. plumbella (Kanerva)
    Cricotechna Falkovitsh, 1972
      C. vitisella (Gregson)
    Plegmidia Falkovitsh, 1972
      P. juncicolella (Stainton)
    Agapalsa Falkovitsh, 1972
      A. betulaenanae (Klimesch)
      A. draghiella (Căpuşe)
      A. idaeella (Hofmann)
      A. rhododendri (Hofmann)
      A. unigenella (Svensson)
      A. vacciniella (Herrich-Schäffer)
      A. viminetella (Zeller)
    Phylloschema Falkovitsh, 1972
      P. glitzella (Hofmann)
    Bima Falkovitsh, 1972
      B. arctostaphyli (Meder)
  COLEOPHORINA Hübner, 1925
    Systrophoeca Falkovitsh, 1972
      S. siccifolia (Stainton)
      S. uliginosella (Glitz)
    Aporiptura Falkovitsh, 1972
      A. aglabitella (Chrétien)
      A. gracilella (Toll)
      A. keireuki (Falkovitsh)
      A. klimeschiella (Toll)
      A. ochroflava (Toll)
      A. poecilella (Walsingham)
      A. traganella (Chrétien)
    Symphopoda Falkovitsh, 1972
      S. candidella (Toll)
      S. cygnipennella (Toll)
      S. lashkarella (Toll & Amsel)
      S. transcaspica (Toll)
    Oedicaula Falkovitsh, 1972
      O. caliacraella (Caradja)
      O. novella (Chrétien)
      O. serinipennella (Christoph)
      O. stephanii (Joannis)
      O. subcastanea (Walsingham)
    Argyractinia Falkovitsh, 1972
      A. argentariella (Klimesch)
      A. eupreta (Walsingham)
      A. helianthemella (Millière)
      A. ochrea (Haworth)

- *Chnoocera* Falkovitsh, 1972
    - *C. botaurella* (Herrich-Schäffer)
    - *C. magnatella* (Toll)
    - *C. schirazella* (Toll)
- *Orthographis* Falkovitsh, 1972
    - *O.* (*O.*) *brevipalpella* (Wocke)
    - *O.* (*O.*) *serratulella* (Herrich-Schäffer)
  - *Phagolamia* Falkovitsh, 1972
    - *O.* (*P.*) *chamaedryella* (Staudinger)
    - *O.* (*P.*) *serpylletorum* (E. Hering)
    - *O.* (*P.*) *struella* (Staudinger)
    - *O.* (*P.*) *virgatella* (Zeller)
  - *Monotemachia* Falkovitsh, 1972
    - *O.* (*M.*) *auricella* (Fabricius)
- *Corethropoea* Falkovitsh, 1972
    - *C. elephantella* (Falkovitsh)
- *Characia* Falkovitsh, 1972
    - *C. haloxyli* (Falkovitsh)

CASIGNETINI Falkovitsh, 1972

- *Aureliania* Căpuşe, 1971
- *Bacescuia* Căpuşe, 1971
- *Casigneta* Wallengren, 1881
- *Perygra* Falkovitsh, 1972
    - *P. adjunctella* (Hodgkinson)
    - *P. agramella* (Wood)
    - *P.* (*P.*) *caespititiella* (Zeller)
    - *P.* (*P.*) *glaucicolella* (Wood)
    - *P.* (*P.*) *murinipennella* (Duponchel)
  - *Perygridia* Falkovitsh, 1972
    - *P.* (*P.*) *sylvaticella* (Wood)
    - *P.* (*P.*) *taeniipennella* (Herrich-Schäffer)
  - *Luzulina* Falkovitsh, 1972
    - *P.* (*L.*) *antennariella* (Herrich-Schäffer)

HERINGIELLINI Căpuşe, 1971

- *Carpochena* Falkovitsh, 1972
    - [= *Heringiella* Börner, 1944]

SYSTEMATIC LIST OF THE FAMILY-GROUP AND GENUS-GROUP NAMES OF THE COLEOPHORIDAE

The family-group and genus-group names of the Coleophoridae are here arranged in a systematic order following Gaede (unpublished manuscript for *Lepid. Cat.*, family Coleophoridae).

COLEOPHORIDAE Hübner, [1825]
- AUGASMIDAE Heinemann, [1876]
- HAPLOPTILIDAE Barnes & McDunnough, 1917
- EUPISTIDAE Fletcher, 1929
- METRIOTINAE Căpuşe, 1971, **syn. n.**
- ISCHNOPHANINI Căpuşe, 1971, **syn. n.**
- CASASINI Căpuşe, 1971, **syn. n.**
- TOLLEOPHORINI Căpuşe, 1971, **syn. n.**

  - HERINGIELLINI Căpuşe, 1971, **syn. n.**
  - RAZOWSKIINI Căpuşe, 1971, **syn. n.**
  - FALKOVITSHIINAE Căpuşe, 1972, **syn. n.**
  - FALKOVITSHIINI Căpuşe, 1972, **syn. n.**
  - CASIGNETINI Falkovitsh, 1972, **syn. n.**
  - AGAPALSINA Falkovitsh, 1972, **syn. n.**
  - CARPOCHENINI Căpuşe, 1973, **syn. n.**

- ***NASAMONICA*** Meyrick, 1922
- ***ENSCEPASTRA*** Meyrick, 1920
- ***SANDALOECA*** Meyrick, 1920
- ***AUGASMA*** Herrich-Schäffer, 1853
- ***METRIOTES*** Herrich-Schäffer, 1853
  - *APLOTES* Herrich-Schäffer, 1853
  - *ASYCHNA* Stainton, 1854
- ***COLEOPHORA*** Hübner, 1822
  - *EUPISTA* Hübner, [1825]
  - *APISTA* Hübner, [1825]
  - *HAPLOPTILIA* Hübner, [1825]
  - *PORRECTARIA* Haworth, 1828
  - *DAMOPHILA* Curtis, 1832
  - *ASTYAGES* Stephens, 1834
  - *METALLOSETIA* Stephens, 1834
  - *CASAS* Wallengren, 1881
  - *CASIGNETA* Wallengren, 1881
  - *CASIGNETELLA* Strand, 1928
  - *HERINGIELLA* Börner, 1944
  - *TOLLEOPHORA* Căpuşe, 1971, **syn. n.**
  - *IONESCUMIA* Căpuşe, 1971, **syn. n.**
  - *STOLLIA* Căpuşe, 1971, **syn. n.**
  - *RAZOWSKIA* Căpuşe, 1971, **syn. n.**
  - *ORGHIDANIA* Căpuşe, 1971, **syn. n.**
  - *FREDERICKOENIGIA* Căpuşe, 1971, **syn. n.**
  - *SUIREIA* Căpuşe, 1971, **syn. n.**
  - *ZAGULAJEVIA* Căpuşe, 1971, **syn. n.**
  - *AMSELIPHORA* Căpuşe, 1971, **syn. n.**
  - *NEMESIA* Căpuşe, 1971, **syn. n.**
  - *ZANGHERIPHORA* Căpuşe, 1971, **syn. n.**
  - *BOURGOGNEJA* Căpuşe, 1971, **syn. n.**
  - *AURELIANIA* Căpuşe, 1971, **syn. n.**
  - *BACESCUIA* Căpuşe, 1971, **syn. n.**
  - *KLINZIGEDIA* Căpuşe, 1971, **syn. n.**
  - *VLADDELIA* Căpuşe, 1971, **syn. n.**
  - *KLIMESCHJA* Căpuşe, 1971, **syn. n.**
  - *GLASERIA* Căpuşe, 1971, **syn. n.**
  - *VALVULONGIA* Căpuşe, 1971, **syn. n.**
  - *FALKOVITSHIA* Căpuşe, 1972, **syn. n.**
  - *HELOPHAREA* Falkovitsh, 1972, **syn. n.**
  - *CRICOTECHNA* Falkovitsh, 1972, **syn. n.**
  - *PLEGMIDIA* Falkovitsh, 1972, **syn. n.**
  - *AGAPALSA* Falkovitsh, 1972, **syn. n.**
  - *PHYLLOSCHEMA* Falkovitsh, 1972, **syn. n.**
  - *BIMA* Falkovitsh, 1972, **syn. n.**
  - *SYSTROPHOECA* Falkovitsh, 1972, **syn. n.**
  - *APORIPTURA* Falkovitsh, 1972, **syn. n.**

SYMPHYPODA Falkovitsh, 1972, **syn. n.**
OEDICAULA Falkovitsh, 1972, **syn. n.**
ARGYRACTINIA Falkovitsh, 1972, **syn. n.**
CHNOOCERA Falkovitsh, 1972, **syn. n.**
ORTHOGRAPHIS Falkovitsh, 1972, **syn. n.**
PHAGOLAMIA Falkovitsh, 1972, **syn. n.**
MONOTEMACHIA Falkovitsh, 1972, **syn. n.**
CORETHROPOEA Falkovitsh, 1972, **syn. n.**
CHARACIA Falkovitsh, 1972, **syn. n.**
PERYGRA Falkovitsh, 1972, **syn. n.**
PERYGRIDIA Falkovitsh, 1972, **syn. n.**
LUZULINA Falkovitsh, 1972, **syn. n.**
CARPOCHENA Falkovitsh, 1972, **syn. n.**
IONNEMESIA Căpuşe, 1973, **syn. n.**
GONIODOMA Zeller, 1849
CORYTHANGELA Meyrick, 1897
IRIOTHYRSA Meyrick, 1908
AMBLYXENA Meyrick, 1914
POROTICA Meyrick, 1913
MACROCORYSTIS Meyrick, 1931
ISCHNOPSIS Walsingham, 1881
ISCHNOPHANES Meyrick, 1891

ALPHABETICAL CATALOGUE OF THE FAMILY-GROUP NAMES

AGAPALSINA Falkovitsh, 1972, *Ent. Obozr.* **51** : 369.

Type-genus: *Agapalsa* Falkovitsh, 1972.

Originally proposed as a subtribe name; currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186-191) of Coleophoridae Hübner, [1825].

‡APLOTINAE Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae:* 56.

The name Aplotinae Căpuşe, 1971, is unavailable as it was first published in synonymy (*Int. Code zool. Nom.*, Article 11 (d)) under Metriotinae Căpuşe, 1971.

AUGASMIDAE Heinemann, [1876], *Schmett. Dtl. Schweiz* (2) **2** (2) : 526.

Type-genus: *Augasma* Herrich-Schäffer, 1852.

Currently considered to be a junior subjective synonym of Coleophoridae Hübner, [1825].

AUGASMINAE Heinemann, [1876]; Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 57.

Type-genus: *Augasma* Herrich-Schäffer, 1852.

Originally proposed as a family name; subsequently used as a subfamily name (Căpuşe, 1971 : 57). Currently considered to be a junior subjective synonym of Coleophoridae Hübner, [1825].

Augasminae has been attributed to 'Heinemann & Wocke, 1877' by Căpuşe. Wocke, *in* Heinemann, *Schmett. Dtl. Schweiz* (2) **2** (2) : v-vi, gives a detailed account of his contributions and those of Heinemann to 'Heft 2'. According to Wocke's statement on p. v the name Augasmidae must be attributed to Heinemann only. 'Heft 2', though dated 1877 on the title page, was published not later than November 1876 (Kirby, 1878, *Zool. Rec.* (1876), **13** (Insecta) : 187).

Handlirsch (1924, *in* Schröder, *Handb. Ent.* **3** : 878) attributed the subfamily name to Rebel, 1899; however, we have been unable to trace this reference.

AUGASMINI Heinemann, [1876]; Handlirsch, 1924, *in* Schröder, *Handb. Ent.* **3** : 878.

Type-genus: *Augasma* Herrich-Schäffer, 1852.

Originally proposed as a family name; subsequently used as a tribe name in the subfamily Tineinae of the Tineidae (Handlirsch, 1924 : 878). Currently considered to be a junior subjective synonym of Coleophoridae Hübner, [1825].

CARPOCHENINI Căpuşe, 1973, *Ent. Z.* **83** : 12 (objective replacement name for Heringiellini Căpuşe, 1971).

Type-genus: *Carpochena* Falkovitsh, 1972.

Heringiellini Căpuşe, 1971, is invalid as a family-group name as its nominal type-genus is a junior homonym (*Int. Code zool. Nom.*, Article 39). Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of Coleophoridae Hübner, [1825].

CASASINI Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 59.

Type-genus: *Casas* Wallengren, 1881.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of Coleophoridae Hübner, [1825].

CASIGNETINI Falkovitsh, 1972, *Ent. Obozr.* **51** : 383.

Type-genus: *Casigneta* Wallengren, 1881, nom. praeocc. [= *Casignetella* Strand, 1828].

Casignetini Falkovitsh, 1972, is invalid as a family-group name as its nominal type-genus is a junior homonym (*Int. Code zool. Nom.*, Article 39). No replacement name is proposed as Casignetini Falkovitsh is currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of Coleophoridae Hübner, [1825].

‡COLEOPHORAE Hübner, [1806], *Tentamen* . . . : [2].

Included in a work rejected for nomenclatural purposes by the International Commission on Zoological Nomenclature, 1926, Opinion 97, *Smithson. misc. Collns* **73** (4) : 19; 1954, Opinion 278, *Opin. Decl. int. Commn zool. Nom.* **6** : 140.

‡COLEOPHORAE Hübner, [1825], *Verz. bekannter Schmett.* : 426.

Incorrect original formation of the family name based on *Coleophora* Hübner, 1822.

See also: Coleophoridae Hübner, [1825].

COLEOPHORIDAE Hübner, [1825]; Bruand, 1850, *Mem. Soc. Emul. Doubs* (1) **3** (3) : 54.

Type-genus: *Coleophora* Hübner, 1822.

Originally proposed as 'Coleophorae', which is an incorrect formation of the family name based on *Coleophora* Hübner, 1822; subsequently emended to Coleophoridae (Bruand, 1850 : 54). Bruand refers to Coleophoridae as a 'Tribus', his 'Tribus' being the equivalent of the family of modern authors.

‡COLEOPHORINA Hübner, [1825]; Herrich-Schäffer, 1857, *KorrespBl. zool.-min. Ver. Regensburg* **11** : 58.

Incorrect subsequent formation of the family name based on *Coleophora* Hübner, 1822.

COLEOPHORINA Hübner, [1825]; Falkovitsh, 1972, *Ent. Obozr.* **51** : 374.

Type-genus: *Coleophora* Hübner, 1822.

Originally proposed as a family name (as 'Coleophorae'); subsequently used as a subtribe name (Falkovitsh, 1972 : 374).

COLEOPHORINAE Hübner, [1825]; Walsingham, 1897, *Proc. zool. Soc. Lond.* **1897** : 102.

Type-genus: *Coleophora* Hübner, 1822.

Originally proposed as a family name (as 'Coleophorae'); subsequently used as a subfamily name in the Elachistidae (Walsingham, 1897 : 102).

‡COLEOPHORINI Hübner, [1825]; Kusnezov, 1916, *Ent. Obozr.* **15** : 628, 643.

Incorrect subsequent formation of the subfamily name based on *Coleophora* Hübner, 1822. Although Coleophorini is the correct formation of the tribe name based on *Coleophora* Hübner, 1822, Kusnezov clearly proposed it as the subfamily name in the Tineidae.

COLEOPHORINI Hübner, [1825]; Handlirsch, 1924, *in* Schröder, *Handb. Ent.* **3** : 885.

Type-genus: *Coleophora* Hübner, 1822.

Originally proposed as a 'stirps' (= family) name (as 'Coleophorae'); subsequently used as a tribe name in the subfamily Coleophorinae of the Tineidae (Handlirsch, 1924 : 885). Handlirsch attributed the tribe name to Kusnezov; however, 'Coleophorini' as used by Kusnezov (1916, *Ent. Obozr.* **15** : 628, 643) is not a tribe name but an incorrect formation of the subfamily name based on *Coleophora* Hübner, [1825].

EUPISTIDAE Fletcher, 1929, *Mem. Dep. Agric. India*, Ent. Ser. **11** : iii, v.

Type-genus: *Eupista* Hübner, [1825].

Currently considered to be a junior subjective synonym of Coleophoridae Hübner, [1825]. Fletcher (1929 : iii) stated '*Coleophora*, Z. 1839 (Hb. 1806; *non-descr.*) is a synonym of *Eupista*' and (1929 : v) '. . . for Coleophoridae (*Coleophora*, Zeller 1839, being a synonym of *Eupista*, Hb. 1826) I use Eupistidae'. However, the name *Coleophora* must be attributed to Hübner (1822, *Syst.-alph. Verz.*: 67) and is not a junior synonym of *Eupista* Hübner, [1825]. The proposal of the family name Eupistidae was therefore unnecessary.

FALKOVITSHIINAE Căpuşe, 1972, *Trav. Inst. Spéol. 'Emile Racovitza'* **11** : 269.

Type-genus: *Falkovitshia* Căpuşe, 1972.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

FALKOVITSHIINI Căpuşe, 1972, *Trav. Inst. Spéol. 'Emile Racovitza'* **11** : 269.

Type-genus: *Falkovitshia* Căpuşe, 1972.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

‡HAPLOPTILIADAE Hampson, 1918, *Novit. Zool.* **25** : 387, 394.

Incorrect subsequent formation of the family name based on *Haploptilia* Hübner, [1825].

‡HAPLOPTILIDAE Barnes & McDunnough, 1917, *Check List Lepid. boreal Am.* : 184.

Incorrect original formation of the family name based on *Haploptilia* Hübner, [1825]. The proposal of a family name based on *Haploptilia* Hübner, [1825], was unnecessary. Barnes & McDunnough referred the name *Coleophora* Hübner to 'Tent. inedit.', considered it to be unavailable, replaced it by *Haploptilia* Hübner, [1825], and consequently based the family name on *Haploptilia; Coleophora* Hübner, [1806], *Tentamen . . .* : [2], was included in a work rejected for nomenclatural purposes by the International Commission on Zoological Nomenclature, 1926, Opinion 97, *Smithson. misc. Collns* **73** (4) : 19; 1954, Opinion 278, *Opin. Decl. int. Commn zool. Nom.* **6** : 140; however, the name *Coleophora* Hübner is available from 1822 (*Syst.-alph. Verz.* : 67).

HERINGIELLINI Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 60

Type-genus: *Heringiella* Börner, 1944, nom. praeocc. [= *Carpochena* Falkovitsh, 1972, objective replacement name].

Heringiellini Căpuşe, 1971, is invalid as a family-group name as its nominal type-genus is a junior homonym (*Int. Code zool. Nom.*, Article 39). Carpochenini Căpuşe, 1973, was proposed as the objective replacement name. Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

ISCHNOPHANINI Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 58.

Type-genus: *Ischnophanes* Meyrick, 1891.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

METRIOTINAE Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 56.

Type-genus: *Metriotes* Herrich-Schäffer, 1853.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

***PARAMETRIOTIDAE** Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 55.

Type-genus: *Parametriotes* Kusnezov, 1916.

The type-genus was originally placed in the Coleophoridae but was recently separated as a distinct family.

RAZOWSKIINI Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 61.

Type-genus: *Razowskia* Căpuşe, 1971.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

TOLLEOPHORINAE Căpuşe 1971; Căpuşe, 1972, *Trav. Inst. Spéol. 'Emile Racovitza'* **11** : 269.

Type-genus: *Tolleophora* Căpuşe, 1971.

Originally proposed as a tribe name; subsequently used as a subfamily name. Currently considered to be a junior subjective synonym of Coleophoridae Hübner, [1825].

TOLLEOPHORINI Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 59.

Type-genus: *Tolleophora* Căpuşe, 1971.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of Coleophoridae Hübner, [1825].

ALPHABETICAL CATALOGUE OF THE GENUS-GROUP NAMES

AGAPALSA Falkovitsh, 1972, *Ent. Obozr.* **51** : 369, 373.

Type-species: ***Coleophora viminetella*** Zeller, 1849, *Linn. ent.* **4** : 394, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

****AGONOXENA*** Meyrick, 1921, *Exot. Microlepidopt.* **2** : 471.

Type-species: ***Agonoxena argaula*** Meyrick, 1921, *ibidem* **2** : 472, by monotypy.

Originally described in the Coleophoridae; subsequently transferred to the Agonoxenidae (Meyrick, 1926, *Exot. Microlepidopt.* **3** : 245).

AMBLYXENA Meyrick, 1914, *Exot. Microlepidopt.* **1** : 207.

Type-species: ***Amblyxena enopias*** Meyrick, 1914, *ibidem* **1** : 207, by monotypy.

AMSELIPHORA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 64.

Type-species: ***Coleophora niveicostella*** Zeller, 1839, *Isis, Leipzig* **1839** : 208, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

APISTA Hübner, [1825], *Verz. bekannt. Schmett.* : 427.

Type-species: ***Tinea gallipennella*** Hübner, 1796, *Samml. eur. Schmett.* **8** : 68, pl. 29, fig. 202, by subsequent designation: Fletcher, 1929, *Mem. Dep. Agric. India,* Ent. Ser. **11** : 18.

The type-species was included by Hübner ([1825] : 427) as 'Gallipenella'. Currently considered to be a junior subjective synonym of *Coleophora* Hübner, 1822.

APLOTES Herrich-Schäffer, 1853, *Syst. Bearb. Schmett. Eur.* **5** : 12, 48 [without included species].

Type-species: *Butalis modestella* Duponchel, 1839, *Hist. nat. Lépid. Papillons Fr.* **11** : 347, pl. 299, fig. 8, by monotypy of *Metriotes* Herrich-Schäffer, 1853.

Herrich-Schäffer (1853 : 12) proposed the name *Aplotes* without included species. In the same work he replaced *Aplotes* by *Metriotes* (1853 : 48, without included species) and associated *Metriotes* with *Butalis modestella* Duponchel, 1839 (1853 : vii [legend to pl. (Microlepid.) XIII, fig. 9]). As *Metriotes* is an objective replacement name for *Aplotes,* both genera have the same type-species.

Butalis modestella Duponchel, 1839, is currently considered to be a junior subjective synonym of *Porrectaria lutarea* Haworth, 1828, *Lepid. Br.* : 537 (Bradley, 1966, *Entomologist's Gaz.* **17**: 132).

Aplotes Herrich-Schäffer, 1853, was not recorded in Neave (1939–66).

Originally described in the Tineidae.

APORIPTURA Falkovitsh, 1972, *Ent. Obozr.* **51** : 374.

Type-species: ***Coleophora keireuki*** Falkovitsh, 1970, *Ent. Obozr.* **49** : 884, figs 11, 23, 45, 46, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

ARGYRACTINIA Falkovitsh, 1972, *Ent. Obozr.* **51** : 377.

Type-species: ***Porrectaria ochrea*** Haworth, 1828, *Lepid. Br.* : 533, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

ASTYAGES Stephens, 1834, *Ill. Br. Ent.*, Haustellata **4** : 279.

Type-species: *Tinea coracipennella* Hübner, 1796, *Samml. eur. Schmett.* **8** : 67, pl. 30, fig. 208, by subsequent designation: Westwood, 1840, *Introd. mod. Classification Insects* **2,** *Synopsis Genera Br. Insects* : 112.

The type-species designations of Westwood (1840, loc. cit.) have been validated by the International Commission on Zoological Nomenclature, 1922, Opinion 71, *Smithson. misc. Collns* **73** : 16–18.

Astyages Stephens, 1834, is a junior objective synonym of *Haploptilia* Hübner, [1825].

Originally described in the Yponomeutidae.

ASYCHNA Stainton, 1854, *Insecta Br.*, Lepid.: Tineina : 245.

Type-species: *Butalis modestella* Duponchel, 1839, *Hist. nat. Lépid. Papillons Fr.* **11** : 347, pl. 299, fig. 8, by subsequent designation, Fletcher, 1929, *Mem. Dep. Agric. India*, Ent. Ser. **11** : 26.

Asychna Stainton, 1854, is a junior objective synonym of *Metriotes* Herrich-Schäffer, 1853.

Butalis modestella Duponchel, 1839, is currently considered to be a junior subjective synonym of *Porrectaria lutarea* Haworth, 1828, *Lepid. Br.* : 537 (Bradley, 1966, *Entomologist's Gaz.* **17** : 132).

Originally described in the Elachistidae.

AUGASMA Herrich-Schäffer, 1853, *Syst. Bearb. Schmett. Eur.* **5** : 13, 50 [without included species]; 1853, *ibidem* **6** : vii [legend to pl. (Microlepid.) XIII, fig. 36]; 1854, *ibidem* **5** : 260.

Type-species: ***Elachista aeratella*** Zeller, 1839, *Isis, Leipzig* **1839** : 212, by monotypy.

Originally described in the Tineidae.

AURELIANIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 65.

Type-species: *Coleophora flavaginella* Lienig & Zeller sensu Căpuşe, 1971 [= ***Coleophora annulatella*** Nylander, 1848, *in* Tengström, *Notis. Sällsk. Faun. Fl. fenn. Förh.* **1** : 143], by original designation.

A study of the original material in the British Museum (Natural History) shows *flavaginella* Lienig & Zeller to be a junior subjective synonym of *sternipennella* Zetterstedt. *Coleophora flavaginella* Lienig & Zeller sensu Căpuşe et auctorum is in fact *annulatella* Nylander. The synonymy of both species may be expressed as follows:

Ornix sternipennella Zetterstedt, 1839
= *Coleophora flavaginella* Lienig & Zeller, 1846
Coleophora annulatella Nylander, 1848
= *Coleophora flavaginella* Lienig & Zeller sensu Căpuşe, 1971, et auctorum.

The name *annulatella* has erroneously been attributed to Tengström. In a footnote on p. 127 Tenström stated that he had received from Nylander the descriptions of certain new species; these descriptions were placed in inverted commas and the names were attributed to Nylander.

The genus *Aureliania* Căpuşe was therefore based on a misidentified type-species. According to the *Int. Code zool. Nom.*, Article 70(a), the case of a misidentified type-species has to be referred to the International Commission on Zoological Nomenclature. We suggest that the Commission be asked to designate as the type-species the nominal species actually involved, namely *Coleophora annulatella* Nylander, 1848 (*Int. Code zool. Nom.*, Article 70 (a) (i)).

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

BACESCUIA Căpuşe, 1971 *Recherches morph. syst. Famille Coleophoridae* : 65.

Type-species: ***Coleophora moeniacella*** Stainton, 1887, *Entomologist's mon. Mag.* **24** : 42, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

****BATRACHEDRA*** Herrich-Schäffer, 1853, *Syst. Bearb. Schmett. Eur.* **5** : 14, 54.

Type-species: ***Ornix turdipennella*** Kollar, 1832, *Beitr. Landesk. Öst. Enns* **2** : 99, by monotypy.

Ornix turdipennella Kollar, 1832, is currently considered to be a junior subjective synonym of *Gracillaria praeangusta* Haworth, 1828, *Lepid. Br.* : 530 (Stainton, 1854, *Insecta Br.*, Lepid.: Tineina : 231).

Originally described in the Tineidae; subsequently included in the Coleophoridae (Walsingham, 1914, *Biologia cent.-am.*, Zool., Lepid.-Heterocera **4** : 320); currently placed in the Momphidae.

BIMA Falkovitsh, 1972, *Ent. Obozr.* **51** : 373.

Type-species: ***Coleophora arctostaphyli*** Meder, 1934, *Int. ent. Z.* **27** : 490, pl., figs 1–4, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

BOURGOGNEJA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 65.

Type species: ***Phalaena (Tinea) onosmella*** Brahm, 1791, *in* Scriba, *Beitr. Insekten-Gesch.* (2) : 133, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

‡*CALARITANIA* Grandi, 1951, *Introd. Studio Ent.* **2** : 123, 1284 [Index] (nomen nudum).

Published without description or indication and associated species.

Grandi attributed the name *Calaritania* to Amsel who, however, has never published it (Amsel, in litt.).

CARPOCHENA Falkovitsh, 1972, *Ent. Obozr.* **51** : 386 (objective replacement name for *Heringiella* Börner, 1944 (nom. praeocc.).

Type-species: ***Coleophora squalorella*** Zeller, 1849, *Linn. ent.* **4** : 197, 226, by monotypy of *Heringiella* Börner, 1944.

Proposed as an objective replacement name for *Heringiella* Börner, 1944 (nom. praeocc.).

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

CASAS Wallengren, 1881, *Ent. Tidskr.* **2** : 95.

Type-species: ***Tinea leucapennella*** Hübner, 1796, *Samml. eur. Schmett.* **8** :67, pl. 30, fig. 205,by subsequent designation: Fletcher, 1929, *Mem. Dep. Agric. India*, Ent. Ser. **11** : 40.

Currently considered to be a junior subjective synonym of *Coleophora* Hübner, 1822.

CASIGNETA Wallengren, 1881, *Ent. Tidskr.* **2** : 96 (nom. praeocc.).

Type species: *Coleophora millefolii* Zeller, 1849, *Linn. ent.* **4** : 360, by subsequent designation: Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 65.

Casigneta Wallengren, 1881, is a junior homonym of *Casigneta* Brunner von Wattenwyl, 1878 (Orthoptera); *Casignetella* Strand, 1928, was proposed as the objective replacement name.

CASIGNETELLA Strand, 1928, *Arch. Naturgesch.* **92** (A) 8 : 50 (objective replacement name for *Casigneta* Wallengren, 1881 (nom. praeocc.)).

Type-species: ***Coleophora millefolii*** Zeller, 1849, *Linn. ent.* **4** : 360, by subsequent designation for *Casigneta* Wallengren, 1881.

Proposed as an objective replacement name for *Casigneta* Wallengren, 1881 (nom. praeocc.).

Currently considered to be a junior subjective synonym of *Coleophora* Hübner, 1822.

CHARACIA Falkovitsh, 1972, *Ent. Obozr.* **51** : 381.

Type-species: ***Coleophora haloxyli*** Falkovitsh, 1970, *Ent. Obozr.* **49** : 885, figs 12, 24, 47, 48, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

CHNOOCERA Falkovitsh, 1972, *Ent. Obozr.* **51** : 379.

Type-species: ***Coleophora botaurella*** Herrich-Schäffer, 1861, *CorrespBl. Sammler Insecten* (2) : 143, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

‡*COLEOPHORA* Hübner, [1806], *Tentamen* . . . : [2].

Included in a work rejected for nomenclatural purposes by the International Commission on Zoological Nomenclature, 1926, Opinion 97, *Smithson. misc. Collns* **73** (4) : 19; 1954, Opinion 278, *Opin. Decl. int. Commn zool. Nom.* **6** : 140.

COLEOPHORA Hübner, 1822, *Syst.-alph. Verz.* : 67.

Type-species: ***Tinea anatipennella*** Hübner, 1796, *Samml. eur. Schmett.* **8** : 68; pl. 27, fig. 186 [as *anatipenella*], by subsequent designation: Kirby, 1897, *Handbk Order Lepid.* **5** : 309.

Căpuşe (1973 : 11), following Fletcher (1929 : 52), cites *Phalaena hemerobiella* Scopoli, 1763, as the type-species. Fletcher, rejecting *Coleophora* Hübner (1806 : [2]), and apparently being unaware of *Coleophora* Hübner (1822 : 67), attributes the name to Zeller (1839 : 206), designating as the type-species *hemerobiella* Scopoli, one of the species included by Zeller. Fletcher's type-designation is invalid because *Phalaena hemerobiella* Scopoli, 1763, is not one of the originally included nominal species of *Coleophora* Hübner, 1822, and, in addition, there exists the earlier valid type-designation of *anatipennella* Hübner by Kirby (1897 : 309). It is of interest to note that *anatipennella* was also cited as the type-species by Walsingham (1914 : 319).

Through this nomenclatural manipulation Căpuşe brought into use an additional genus. By accepting *hemerobiella* as the type-species he transferred the name *Coleophora* from the *anatipennella*-group to *hemerobiella*, a species not previously considered by either Căpuşe or Falkovitsh. For the *anatipennella*-group he then used the name *Porrectaria* Haworth, 1828.

See also: *Agapalsa* Falkovitsh, 1972; *Amseliphora* Căpuşe, 1971; *Apista* Hübner, [1825]; *Aporiptura* Falkovitsh, 1972; *Argyractinia* Falkovitsh, 1972; *Astyages* Stephens, 1834; *Aureliania* Căpuşe, 1971; *Bacescuia* Căpuşe, 1971; *Bima* Falkovitsh, 1972; *Bourgogneja* Căpuşe, 1971; *Carpochena* Falkovitsh, 1972; *Casas* Wallengren, 1881; *Casigneta* Wallengren, 1881; *Casignetella* Strand, 1928; *Characia* Falkovitsh, 1972; *Chnoocera* Falkovitsh, 1972; *Corethropoea* Falkovitsh, 1972; *Cricotechna* Falkovitsh, 1972; *Damophila* Curtis, 1832; *Eupista* Hübner, [1825]; *Falkovitshia* Căpuşe, 1972; *Frederickoenigia* Căpuşe, 1971; *Glaseria* Căpuşe, 1971; *Haploptilia* Hübner, [1825]; *Helopharea* Falkovitsh, 1972; *Heringiella* Börner, 1944; *Ionnemesia* Căpuşe, 1973; *Ionescumia* Căpuşe, 1971; *Klimeschja* Căpuşe, 1971; *Klinzigedia* Căpuşe, 1971; *Luzulina* Falkovitsh, 1972; *Metallosetia* Stephens, 1834; *Monotemachia* Falkovitsh, 1972; *Nemesia* Căpuşe, 1971; *Oedicaula* Falkovitsh, 1972; *Orghidania* Căpuşe, 1971; *Orthographis* Falkovitsh, 1972; *Perygra* Falkovitsh, 1972; *Perygridia* Falkovitsh, 1972; *Phagolamia* Falkovitsh, 1972; *Phylloschema* Falkovitsh, 1972; *Plegmidia* Falkovitsh, 1972; *Porrectaria* Haworth, 1828; *Razowskia* Căpuşe, 1971; *Stollia* Căpuşe, 1971; *Suireia* Căpuşe, 1971; *Symphopoda* Falkovitsh, 1972; *Systrophoeca* Falkovitsh, 1972; *Tolleophora* Căpuşe, 1971; *Valvulongia* Căpuşe, 1971; *Vladdelia* Căpuşe, 1971; *Zagulajevia* Căpuşe, 1971; *Zangheriphora* Căpuşe, 1971.

CORETHROPOEA Falkovitsh, 1972, *Ent. Obozr.* **51** : 381.

Type-species: ***Coleophora elephantella*** Falkovitsh, 1970, *Ent. Obozr.* **49** : 883, figs 11, 23, 43, 44, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

CORYTHANGELA Meyrick, 1897, *Proc. Linn. Soc. N.S.W.* **22** : 298 [key], 299.

Type-species: ***Corythangela galeata*** Meyrick, 1897, *ibidem* **22** : 300, by monotypy.

Originally described in the Elachistidae.

CRICOTECHNA Falkovitsh, 1972, *Ent. Obozr.* **51** : 371.

Type-species: ***Coleophora vitisella*** Gregson, 1856, *Zoologist* **14** : 5167, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

DAMOPHILA Curtis, 1832, *Br. Ent.* **9**, folio 391.

Type-species: ***Porrectaria spissicornis*** Haworth, 1828, *Lepid. Br.* : 537, by original designation.

Currently considered to be a junior subjective synonym of *Coleophora* Hübner, 1822.

Originally described in the Tineidae.

See also: *Metallosetia* Stephens, 1834.

ENSCEPASTRA Meyrick, 1920, *Ann. S. Afr. Mus.* **17** : 300.

Type-species: ***Enscepastra plagiopa*** Meyrick, 1920, *ibidem* **17** : 301, by monotypy.

EUPISTA Hübner, [1825], *Verz. bekannt. Schmett.* : 426.

Type-species: ***Tinea ornatipennella*** Hübner, 1796, *Samml. eur. Schmett.* **8** : 69, pl. 29, fig. 199, by subsequent designation: Fletcher, 1929, *Mem. Dep. Agric. India*, Ent. Ser. **11** : 91.

Currently considered to be a junior subjective synonym of *Coleophora* Hübner, 1822.

FALKOVITSHIA Căpuşe, 1972, *Trav. Inst. Spéol. 'Emile Racovitza'* **11** : 265.

Type-species: ***Falkovitshia marcella*** Căpuşe, 1972, *ibidem* **11** : 266, figs 1, 2, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

FREDERICKOENIGIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae:* 63.

Type-species: ***Ornix flavipennella*** Duponchel, 1843, *Hist. nat. Lépid. Papillons Fr.*, Suppl. **4** : 338, pl. 78, fig. 6, by original designation and monotypy.

The type-species was cited by Căpuşe as '*Coleophora flavipennella* Herrich-Schäffer, 1855.'

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

GLASERIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 66.

Type-species: ***Coleophora biseriatella*** Staudinger, 1859, *Stettin. ent. Ztg* **20** : 255, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

GONIODOMA Zeller, 1849, *Linn. ent.* **4** : 193, 195, 196, 410.

Type-species: ***Goniodoma auroguttella*** Zeller, 1849, *ibidem* **4** : 410, by monotypy.

Zeller (loc. cit.) attributed *auroguttella* to Fischer von Röslerstamm (1841, *Abbildungen Bericht. Ergänzung Schmettkde* : 253, pls 86, 87) who misidentified *Euspilapteryx auroguttella* Stephens (1835, *Ill. Br. Ent.*, Haustellata **4** : 363). According to the *Int. Code zool. Nom.*, Article 70(b), the correct name of the type-species is *Goniodoma auroguttella* Zeller, 1849.

Originally described in the 'Tineaceen.'

HAPLOPTILIA Hübner, [1825], *Verz. bekannt. Schmett.* : 428.

Type-species: ***Tinea coracipennella*** Hübner, 1796, *Samml. eur. Schmett.* **8** : 67, pl. 30, fig. 208, by subsequent designation: Hampson, 1918, *Novit. zool.* **25** : 387.

Currently considered to be a junior subjective synonym of *Coleophora* Hübner, 1822.

See also: *Astyages* Stephens, 1834.

HELOPHAREA Falkovitsh, 1972, *Ent. Obozr.* **51** : 370.

Type-species: ***Coleophora ledi*** Stainton, 1860, *Nat. Hist. Tineina* **5** : 210, pl. 16, fig. 3, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

HERINGIELLA Börner, 1944, *in* Brohmer, *Fauna Dtl.* (Edn 5) : 402 (nom. praeocc.).

Type-species: *Coleophora squalorella* Zeller, 1849, *Linn. ent.* **4** : 197, 226, by monotypy.

Heringiella Börner, 1944, is a junior homonym of *Heringiella* Berg, 1898 (Lepidoptera, Pyralidae); *Carpochena* Falkovitsh, 1972, was proposed as the objective replacement name.

IONESCUMIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae:* 61.

Type-species: ***Coleophora clypeiferella*** Hofmann, 1871, *Stettin. ent. Ztg* **32** : 221, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

IONNEMESIA Căpuşe, 1973, *Ent. Z.* **83** : 12 (objective replacement name for *Nemesia* Căpuşe, 1971 (nom. praeocc.)).

Type-species: **Coleophora chalcogrammella** Zeller, 1839, *Isis, Leipzig* **1839** : 207, by original designation for and monotypy of *Nemesia* Căpuşe, 1971.

Proposed as an objective replacement name for *Nemesia* Căpuşe, 1971 (nom. praeocc.).

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

IRIOTHYRSA Meyrick, 1908, *Proc. zool. Soc. Lond.* **1908** : 736.

Type-species: ***Iriothyrsa melanogma*** Meyrick, 1908, *ibidem* **1908** : 736, by monotypy.

Originally described in the Plutellidae.

ISCHNOPHANES Meyrick, 1891, *Entomologist's mon. Mag.* **27** : 60.

Type-species: ***Ischnophanes monocentra*** Meyrick, 1891, *ibidem* **27** : 60, by monotypy.

Originally described in the [Elachistidae].

ISCHNOPSIS Walsingham, 1881, *Trans. ent. Soc. Lond.* **1881** : 236.

Type-species: ***Ischnopsis angustella*** Walsingham, 1881, *ibidem* **1881** : 237, pl. 10, fig. 11, by monotypy.

Originally described in the Tineidae.

KLIMESCHJA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 66.

Type-species: **Coleophora oriolella** Zeller, 1849, *Linn. ent.* **4** : 258, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

KLINZIGEDIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 65; Sommaire: [2] [as *Klinzigia*, incorrect (multiple) original spelling].

Type-species: **Coleophora phlomidella** Christoph, 1862, *Stettin. ent. Ztg* **23** : 222, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

‡*KLINZIGIA* Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae*, Sommaire: [2].

Incorrect (multiple) original spelling of *Klinzigedia* Căpuşe, 1971. The incorrect spelling *Klinzigia* was used only once in the Sommaire and it was corrected to *Klinzigedia* on an errata slip which was issued with Căpuşe's work.

LUZULINA Falkovitsh, 1972, *Ent. Obozr.* **51** : 385.

Type-species: **Coleophora antennariella** Herrich-Schäffer, 1861, *CorrespBl. Sammler Insecten* (2) : 134, by original designation and monotypy.

Originally proposed as a subgenus of *Perygra* Falkovitsh, 1972; currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

MACROCORYSTIS Meyrick, 1931, *Exot. Microlepidopt.* **4** : 49.

Type-species: ***Macrocorystis byrsostola*** Meyrick, 1931, *ibidem* **4** : 49, by monotypy.

METALLOSETIA Stephens, 1834, *Ill. Br. Ent.*, Haustellata **4** : 283.

Type-species: *Porrectaria spissicornis* Haworth, 1828, *Lepid. Br.* : 537, by subsequent designation: Westwood, 1840, *Introd. mod. Classification Insects*, **2**, *Synopsis Genera Br. Insects:* 112.

The type-species designations of Westwood (1840, loc cit.) have been validated by the International Commission on Zoological Nomenclature, 1922, Opinion 71, *Smithson. misc. Collns* **73** : 16–18.

Metallosetia Stephens, 1834, is a junior objective synonym of *Damophila* Curtis, 1832.

Originally described in the Yponomeutidae.

METRIOTES Herrich-Schäffer, 1853, *Syst. Bearb. Schmett. Eur.* **5** : 48 [without included species], vii [legend to pl. (Microlepid.) XIII, fig. 19]; 1854, *ibidem* **5** : 214 (objective replacement name for *Aplotes* Herrich-Schäffer, 1853).

Type-species: ***Butalis modestella*** Duponchel, 1839, *Hist. nat. Lepid. Papillons Fr.* **11** : 347, pl. 299, fig. 8, by monotypy.

Butalis modestella Duponchel, 1839, is currently considered to be a junior subjective synonym of *Porrectaria lutarea* Haworth, 1828, *Lepid Br.* : 537 (Bradley, 1966, *Entomologist's Gaz.* **17** : 132).

Originally described in the Tineidae.

See also: *Aplotes* Herrich-Schäffer, 1853; *Asychna* Stainton, 1854.

MONOTEMACHIA Falkovitsh, 1972, *Ent. Obozr.* **51** : 381.

Type-species: ***Tinea auricella*** Fabricius, 1794, *Ent. syst.* **3** (2) : 300, by monotypy.

Originally proposed as a subgenus of *Orthographis* Falkovitsh, 1972; currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

NASAMONICA Meyrick, 1922, *Exot. Microlepidopt.* **2** : 555.

Type-species: ***Nasamonica oxymorpha*** Meyrick, 1922, *ibidem* **2** : 555, by monotypy.

NEMESIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 64 (nom. praeocc.).

Type-species: *Coleophora chalcogrammella* Zeller, 1839, *Isis, Leipzig* **1839** : 207, by original designation and monotypy.

Nemesia Căpuşe, 1971, is a junior homonym of *Nemesia* Savigny, 1826 (Arachnida); *Ionnemesia* Căpuşe, 1973, was proposed as the objective replacement name.

OEDICAULA Falkovitsh, 1972, *Ent. Obozr.* **51** : 375.

Type-species: ***Coleophora serinipennella*** Christoph, 1872, *Horae Soc. ent. ross.* **9** : 36, pl. 2A, fig. 32, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

ORGHIDANIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae:* 63.

Type-species: ***Tinea gryphipennella*** Hübner, 1796, *Samml. eur. Schmett.* **8** : 68, pl. 30, fig. 206, by original designation and monotypy.

The type-species was cited by Căpuşe as '*Ornix gryphipennella* Bouché, 1834.' *Ornix gryphipenella* Bouché, 1834, *Naturgesch. Insekten*: 131, is an incorrect subsequent spelling of *Tinea gryphipennella* Hübner, 1796.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

ORTHOGRAPHIS Falkovitsh, 1972, *Ent. Obozr.* **51** : 379, 380.

Type-species: ***Coleophora brevipalpella*** Wocke, 1874, *Z. Ent.* (N.F.) **4** : 80, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

****PARAMETRIOTES*** Kusnezov, 1916, *Ent. Obozr.* **15** : 627, 628, 643.

Type-species: ***Parametriotes theae*** Kusnezov, 1916, *ibidem* **15** : 627, 628, 643, by original designation and monotypy.

Originally described in the Tineidae: 'Coleophorini', subsequently transferred to the Parametriotidae (Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae:* 55).

PERYGRA Falkovitsh, 1972, *Ent. Obozr.* **51** : 385.

Type-species: ***Coleophora caespititiella*** Zeller, 1839, *Isis, Leipzig* **1839** : 208, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

PERYGRIDIA Falkovitsh, 1972, *Ent. Obozr.* **51** : 385.

Type-species: ***Coleophora sylvaticella*** Wood, 1892, *Entomologist's mon. Mag.* **28** : 118, pl. 4, fig. 1, by original designation.

Originally proposed as a subgenus of *Perygra* Falkovitsh, 1972; currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

PHAGOLAMIA Falkovitsh, 1972, *Ent. Obozr.* **51** : 381.

Type-species: ***Coleophora virgatella*** Zeller, 1849, *Linn. ent.* **4** : 198 [key], 291, by original designation.

Originally proposed as a subgenus of *Orthographis* Falkovitsh, 1972; currently considered to be a junior subjective synonym (**syn. n.,** see pp. 186–191) of *Coleophora* Hübner, 1822.

PHYLLOSCHEMA Falkovitsh, 1972, *Ent. Obozr.* **51** : 373.

Type-species: ***Coleophora glitzella*** Hofmann, 1869, *Stettin. ent. Ztg* **30** : 119, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

PLEGMIDIA Falkovitsh, 1972, *Ent. Obozr.* **51** : 371.

Type-species: ***Coleophora juncicolella*** Stainton, 1851, *Suppl. Cat. Br. Tineidae & Pterophoridae* : 7, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

POROTICA Meyrick, 1913, *Ann. Transv. Mus.* **3** : 324.

Type-species: ***Porotica astragalis*** Meyrick, 1913, *ibidem* **3** : 324, by monotypy.

PORRECTARIA Haworth, 1828, *Lepid. Br.* : 533.

Type-species: *Porrectaria anatipennis* Haworth, 1828, *ibidem* : 534 [= *Tinea anatipennella* Hübner, 1796, *Samml. eur. Schmett.* **8** : 68, pl. 27, fig. 186], by subsequent designation: Curtis, 1838, *Br. Ent.* **15**, folio 687.

Porrectaria anatipennis Haworth, 1828, is an unjustified emendation of *Tinea anatipennella* Hübner, 1796.

The type-species was cited by Curtis (loc. cit.) as 'Tinea Anatipennella Hüb.'

Porrectaria Haworth, 1828, is a junior objective synonym of *Coleophora* Hübner, 1822.

RAZOWSKIA Căpușe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 61.

Type-species: ***Coleophora hafneri*** Prohaska, 1923, *Carinthia II* **32/33**: 102, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

SANDALOECA Meyrick, 1920, *Ann. S. Afr. Mus.* **17** : 300.

Type-species: ***Sandaloeca lathraea*** Meyrick, 1920, *ibidem* **17** : 300, by monotypy.

STOLLIA Căpușe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 61.

Type-species: ***Ornix binotapennella*** Duponchel, 1843, *Hist. nat. Lépid. Papillons Fr.*, Suppl. **4** : 295, pl. 75, fig. 3, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

SUIREIA Căpușe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 63.

Type-species: ***Ornix badiipennella*** Duponchel, 1843, *Hist. nat. Lépid. Papillons Fr.*, Suppl. **4** : 346, pl. 78, fig. 14, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

SYMPHYPODA Falkovitsh, 1972, *Ent. Obozr.* **51** : 375.

Type-species: ***Coleophora transcaspica*** Toll, 1959, *Stuttgart. Beitr. Naturk.* **29** : 5, figs 5a-f, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

SYSTROPHOECA Falkovitsh, 1972, *Ent. Obozr.* **51** : 374.

Type-species: ***Coleophora siccifolia*** Stainton, 1856, *Entomologist's Annu.* **1856** : 37, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

*****TOCASTA*** Busck, 1912, *Smithson. misc. Collns* **59** (4) : 4.

Type-species: ***Tocasta priscella*** Busck, 1912, *ibidem* **59** (4) : 4, by original designation and monotypy.

Originally described in the Coleophoridae; currently placed in the Tineidae.

TOLLEOPHORA Căpușe, 1971, *Recherches morph. syst. Famille Coleophoridae*: 59.

Type-species: ***Coleophora asthenella*** Constant, 1893, *Annls Soc. ent. Fr.* **62** : 400, pl. 11, fig. 8, by original designation and monotypy.

The first part of the description of *C. asthenella* Constant was published (loc. cit.) in the 'troisième trimestre', dated 30 December, 1893; the last part of the description was published (loc. cit.) in the 'quatrième trimestre', dated 30 April, 1894. As the first part of the description satisfies all the relevant provisions of the *Int. Code zool. Nom.*, the name ***asthenella*** must be dated from 1893.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

VALVULONGIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 66.

Type-species: ***Coleophora falcigerella*** Christoph, 1872, *Horae Soc. ent. ross.* **9** : 31, pl. 2(A), fig. 27, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

VLADDELIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 65.

Type-species: ***Coleophora niveistrigella*** Wocke, [1876], *in* Heinemann, *Schmett. Dtl. Schweiz* (2)**2**(2) : 654, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

ZAGULAJEVIA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 64.

Type-species: ***Coleophora tadzhikiella*** Danilevski, 1955, *Ent. Obozr.* **34** : 116, figs 7–9, by original designation.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora*, Hübner, 1822.

ZANGHERIPHORA Căpuşe, 1971, *Recherches morph. syst. Famille Coleophoridae* : 64.

Type-species: **[*Tinea*] *laricella*** Hübner, [1817], *Samml. eur. Schmett.* **8**, pl. 64, fig. 427, by original designation and monotypy.

Currently considered to be a junior subjective synonym (**syn. n.**, see pp. 186–191) of *Coleophora* Hübner, 1822.

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THE NOMINAL TAXA DESCRIBED BY R. B. BENSON AND THEIR TYPES, WITH A BIBLIOGRAPHY OF HIS WORKS (HYMENOPTERA)

J. QUINLAN

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ENTOMOLOGY Vol. 30 No. 4
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SYNOPSIS

A catalogue of the nominal taxa described by R. B. Benson is given with notes on the type-material on which the names are based. A total of 51 family-group, 51 genus-group and 264 species-group names is included; one lectotype is newly designated. A bibliography to 219 papers and 20 reviews is given, together with a species index.

INTRODUCTION

THE purpose of this paper is to bring together the very substantial contribution to the knowledge of the Symphyta published during the years 1923–1968 by the late R. B. Benson. He was interested in the Symphyta of Europe, the Mediterranean, arctic and montane regions, Australia and New Guinea; in the Siricoidea, Cephoidea, Xyeloidea, Orussoidea, Tenthredinoidea : Nematinae, *Athalia*, *Tenthredopsis* and *Rhogogaster* of the world. Prior to Benson's works on the Symphyta the standard works for the European fauna were those of Cameron, Morice, Konow, Enslin. These were later added to by the contributions of Benes, Linqvist, Malaise, Vikberg and other continental authors. In England the late Dr R. C. L. Perkins had started working on the sawflies of Devonshire. He worked especially on the Nematinae and *Dolerus;* he prepared keys to most of the genera of the Nematinae and his key to the British species of *Dolerus* (*Entomologist's mon. Mag.* **66** : 235–

248) was published. Perkins allowed Benson to take copies of his keys to the Nematine genera. These were extremely useful to Benson and gradually became altered beyond recognition in the course of his research, leading finally to his three major works in the Royal Entomological Society of London's *Handbooks for the Identification of British Insects* series.

The paper is presented in two parts; the first is an alphabetical catalogue of the taxa and names proposed by Benson and the second is a bibliography of Benson's works. All species-group names listed in Part I are listed in their original combinations and for each taxon the entry is arranged to show the following information in the sequence indicated.

> Name; author; date and page references of the original publication; status and sex of the primary type; authority for the lectotype designation (if relevant); data of the primary type; type-depository. Explanatory notes and annotations.

The following points should be noted in relation to the foregoing list of holotype information. In a few instances holotypes have not been confirmed as being housed in the institutions named in the original publication. It has sometimes been necessary to cite syntype series where no holotype was designated. The one new lectotype designation is indicated by the words 'LECTOTYPE' and 'by present designation'.

Of a total of 264 holotypes 98 are deposited in institutions other than the British Museum (Natural History)

Although not published in his earlier papers the later papers did have the holotype numbers in the original descriptions. I have in the course of checking the holotypes housed in the BMNH added the serial numbers. The actual label is written in the style B.M.TYPE. HYM. 1.778 but for convenience I have listed the numbers as for example BMNH. No. 1.778. Where holotypes are deposited in other institutions I have indicated the same together with any other prefix attached to the number. All Benson's holotypes bear a circular red-edged label with the word type, holotype or allotype printed in the centre. All Symphyta holotype numbers in the BMNH collection are prefixed with the serial number 1. All holotypes carry determination labels in Benson's handwriting together with printed data labels as indicated in the original publication unless otherwise indicated. Holotypes deposited in other institutions, although not always seen by the author, have been checked and their condition reported on unless otherwise indicated. In some instances Benson (mainly 1938*h*) proposed subfamilies and tribes based upon type-genera for which family-group names already existed. I have not considered it necessary to search out the first usage (and therefore the true authorship) of such names, and have merely listed them as Benson proposed them. An example is Pamphiliinae which Benson cited as 'subfam. n.', although the family name Pamphiliidae (also based on *Pamphilius* Latreille) had existed for very many years. Reviews by Benson are listed separately rather than in the main bibliography. In the case of one joint paper with Wong (1965) the species described (*Pristophora plaumanni*) is attributed to Wong and therefore not included in the catalogue of species-group taxa. Benson's last paper (1968, *Hymenoptera from Turkey. Symphyta*) had already been submitted for publication before his death.

To condense the text the following abbreviations have been used. The depositories are listed in alphabetical order of the abbreviations. This list includes depositories for the paratypes.

AM	Australian Museum, Sydney.
AMG	Albany Museum, Grahamstown.
ANIC	Australian National Insect Collection, Canberra.
BMNH	British Museum (Natural History), London.
BNN	Bundner Naturhistorisches and Nationalpark, Chur.
BPBM	Bernice P. Bishop Museum, Honolulu.
CIBC	Commonwealth Institute of Biological Control, Bangalore.
CNC	Canadian National Collection, Ottawa.
DEI	Deutsches Entomologishes Institut, Eberswalde.
IE	Istituto di Entomologia, Bologna.
IEA	Istituto di Entomologia Agraria dell'Università degli Studi, Padua.
IEE	Instituto Español de Entomología, Madrid.
MACN	Museo Argentino de Ciencias Naturales, Buenos Aires.
MCSN	Museo Civico di Storia Naturale, Verona.
MCSNGD	Museo Civico di Storia Naturale 'Giacomo Doria', Genoa.
MM	Moravske Museum, Preslova 1, Brno.
MNHN	Muséum National d'Histoire Naturelle, Paris.
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin.
MP	Museu de Zoologia da Universidade, Sao Paulo.
MRAC	Musée Royal de l'Afrique Centrale, Tervuren.
MZ	Musée Zoologique, Lausanne.
NM	Naturhistorisches Museum, Vienna.
NMP	Natal Museum, Pietermaritzburg.
NMR	National Museum of Rhodesia, Bulawayo.
NMV	National Museum of Victoria, Melbourne.
NR	Naturhistoriska Riksmuseum, Stockholm.
QM	Queensland Museum, Brisbane.
RNH	Rijksmuseum van Natuurlijke Historie, Leiden.
SAM	South Australian Museum, Adelaide.
UM	University Museum, Oxford.
USNM	U.S. National Museum, Washington.
UZI	Universitetets Zoologiska Institution, Lund.
WAM	Western Australian Museum, Perth.
ZM	Musée Zoologique de Strasbourg, Strasbourg.
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich.

ACKNOWLEDGEMENTS

It gives me great pleasure to thank all those people in the many scientific institutions holding Benson holotype and paratype material for their kind assistance in answering my queries and in many cases listing many useful pieces of information concerning the material. I am grateful also to Dr R. W. Crosskey, the Head of the Hymenoptera Section in the British Museum (Natural History), for suggesting the compilation of this paper and for his help and constructive criticism during its preparation.

A SHORT BIOGRAPHY OF R. B. BENSON

Robert Bernard Benson, the son of W. L. M. Benson of Berkhamsted, was born in London on 16 May 1904 and died on 5 November 1967. He was educated at Berkhamsted School and St Catherine's College, Cambridge. After a short period as a schoolmaster he joined the staff of the British Museum (Natural History) on 1 January 1929, in the Department of Entomology. He was appointed to take charge of Symphyta and Cynipoidea and he became a principal authority on sawflies, this being based on material built up from his own collecting both here in the United Kingdom and abroad. He had a wide interest in natural history, particularly in the botanical field, which enabled him better to understand the ecological problems of his chosen group, the Symphyta. He undertook many collecting trips to continental Europe and in 1956 he visited Canada – having been successful in obtaining a Leverhulme Research Fellowship. He was very active in the field of nature conservation, being Chairman of the Royal Entomological Society's Conservation (Insect Preservation) Committee for a number of years. He served a term as President of the Hertfordshire Natural History Society and of the Society for British Entomology. From 1936–1967 he was on the panel of editors for the *Entomologist's Monthly Magazine*. In 1949 he was made Membre Honoraire of the Societé Royale d'Entomologie de Belgique. In the museum his outstanding contribution to research in the sphere of entomology was recognized by his merit promotion to Senior Principal Scientific Officer.

PART I. AN ALPHABETICAL CATALOGUE OF THE TAXA AND NAMES PROPOSED BY BENSON AND THEIR TYPES

Family-group names

ACIDEOPHORINI Benson, 1938*h* : 366. Type-genus: *Acideophora* Konow, 1899.

ATELOZINI Benson, 1938*h* : 367. Type-genus: *Ateloza* Enderlein, 1919.

ATHERMANTINAE Benson, 1938*h* : 375. Type-genus: *Athermantus* Kirby, 1882.

ATHETOCEPHINAE Benson, 1935*f* : 541. Type-genus: *Athetocephus* Benson, 1939*f*.

ATOMACERINAE Benson, 1938*h* : 373. Type-genus: *Atomacera* Say, 1836.

CACOSYNDIINI Benson, 1959*f* : 125. Type-genus: *Cacosyndia* Kirby, 1883.

CAENOLYDINI Benson, 1945*e* : 29. Type-genus: *Caenolyda* Konow, 1897.

CALIROINI Benson, 1938*h* : 368. Type-genus: *Caliroa* Costa, 1859.

CEPHALCIINAE Benson, 1945*e* : 28. Type-genus: *Cephalcia* Panzer, 1805.

CEPHALCIINI Benson, 1945*e* : 29. Type-genus: *Cephalcia* Panzer, 1805.

CLADIUCHINI Benson, 1938*h* : 366. Type-genus: *Cladiucha* Konow, 1902.

CONOCOXINAE Benson, 1938*h* : 382. Type-genus: *Conocoxa* Rohwer, 1911.

CORYNINAE Benson, 1938*h* : 371. Type-genus: *Corynis* Thunberg, 1789.

DIELOCERINAE Benson, 1938*h* : 375 (as Dielocorinae, lapsus). Type-genus: *Dielocerus* Curtis, 1841.

DISTEGINI Benson, 1938*h* : 367. Type-genus: *Distega* Konow, 1904.

DOCHMIOGLENEINI Benson, 1938*h* : 364. Type-genus: *Dochmioglene* Enderlein, 1919.

ERIGLENINAE Benson, 1938*h* : 375. Type-genus: *Eriglenum* Konow, 1901.

GUIGLIINI Benson, 1955*a* : 16. Type-genus: *Guiglia* Benson, 1938.

HEPTAMELINI Benson, 1938*h* : 368. Type-genus: *Heptamelus* Haliday, 1855.

LEPTORUSSINI Benson, 1955*a* : 19 Type-genus: *Leptorussus* Benson, 1955.

MACROPHYINI Benson, 1946*b* : 34. Type-genus: *Macrophya* Dahlbom, 1835.

MACROXYELINAE Benson, 1945*f* : 36,37. Type-genus: *Macroxyela* Kirby, 1882.

NEUROTOMINI Benson, 1945*e* : 29 Type-genus: *Neurotoma* Konow, 1897.

PACHYCEPHINI Benson, 1946*c* : 93, 100. Type-genus: *Pachycephus* Stein, 1876.

PACHYLOSTICTINAE Benson, 1938*h* : 371. Type-genus: *Pachylosticta* Klug, 1824.

PACHYLOTINAE Benson, 1938*h* : 375. Type-genus: *Pachylota* Westwood, 1841. Benson attributed the name *Pachylota* to Curtis in error.

PAMPHILIINAE Benson, 1945*c* : 28. Type-genus: *Pamphilius* Latreille, 1802.

PAMPHILIINI Benson, 1945*c* : 30. Type-genus: *Pamphilius* Latreille, 1802.

PARALYPIINAE Benson, 1935*e* : 224. Type-genus: *Paralypia* Kirby, 1882.

PEDICRISTINAE Benson, 1935*a* : 6. Type-genus: *Pedicrista* Benson, 1935.

PERGULINAE Benson, 1934*i* : 463. Type-genus: *Pergula* Morice, 1918.

PERINEURINI Benson, 1946*b* : 35. Type-genus: *Perineura* Hartig, 1837.

PLEURONEURINAE Benson, 1945*f* : 36. Type-genus: *Pleuroneura* Konow, 1897.

PTERYPERGINAE Benson, 1938*h* : 381. Type-genus: *Pteryperga* Benson, 1938.

PSEUDODINEURINI Benson, 1938*h* : 369. Type-genus: *Pseudodineura* Konow, 1885.

PTILIINI Benson, 1938*h* : 375. Type-genus: *Ptilia* Lepeletier, 1823.

SCIAPTERYGINI Benson, 1946*b* : 35. Type-genus: *Sciapteryx* Stephens, 1835.

SENOCLIINI Benson, 1938*h* : 367. Type-genus: *Senoclia* Cameron, 1877.

SERICOCERINI Benson, 1938*h* : 376. Type-genus: *Sericocera* Brullé, 1846.

SJOESTEDTIINI Benson, 1938*h* : 375. Type-genus: *Sjoestedtia* Konow, 1907.

STERICTOPHORINI Benson, 1938*h* : 376. Type-genus: *Sterictiphora* Billberg, 1820.

STYRACOTECHYINAE Benson, 1935*e* : 223. Type-genus: *Styractechys* Benson, 1935.

SYNTEXIDAE Benson, 1935*f* : 536. Type-genus: *Syntexis* Rohwer, 1915.

TANYPHATNIDEINI Benson, 1938*h* : 375. Type-genus: *Tanyphatnidea* Rohwer, 1912.

TENTHREDOPSINI Benson, 1946*b* : 35. Type-genus: *Tenthredopsis* Costa, 1859.

TOMOSTETHINI Benson, 1938*h* : 367. Type-genus: *Tomostethus* Konow, 1886.

TOPOTRITINI Benson, 1938*h* : 375. Type-genus: *Topotrita* Kirby, 1882.

THEMINAE Benson, 1938*h* : 375. Type-genus: *Themos* Norton, 1867.

TRICHORHACHINAE Benson, 1938*h* : 373. Type-genus: *Trichorhachus* Kirby, 1882.

XENAPATEINI Benson, 1938*h* : 366. Type-genus: *Xenapates* Kirby, 1882.

XYELECIINAE Benson, 1945*f* : 36. Type-genus: *Xyelecia* Ross, 1932.

Genus-group taxa

ANAFENUSA Benson, 1959*e* : 92. Type-species: *Entodecta impropia* Malaise, 1931, by original designation.

ANATAXATES Benson, 1939*e* : 122. Type-species: *Taxonus gaullei* Konow, 1896, by original designation.

ANTIPERGA Benson, 1939*g* : 329. Type-species: *Perga antiopa* Morice, 1919, by original designation.

APETHYMUS Benson, 1939*a* : 112. Type-species: *Dolerus abdominalis* Lepeletier, 1823, by original designation [cited as *Emphytus abdominalis* (Lepeletier) Benson].

ATHETOCEPHUS Benson, 1935*f* : 541. Type-species: *Athetocephus madacassus* Benson, 1935, by original designation.

CEPHALOCEPHUS Benson, 1946*c* : 100. Type-species: *Cephalocephus xanthus* Benson, 1946, by original designation.

CHEILOPHLEPS Benson, 1938*f* : 237. Type-species: *Cheilophleps xantha* Benson, 1938, by original designation.

CLADARDIS Benson, 1952*b* : 103. Type-species: *Tenthredo elongatula* Klug, 1814, by monotypy.

DENTATHALIA Benson, 1931*a* : 134 (subgenus of *Athalia* Leach, 1817). Type-species: *Athalia scutellariae* Cameron, 1881, by original designation.

DICROSTEMA Benson, 1952*b* : 98, 101. Type-species: *Selandria gracilicornis* Zaddach, 1859, by original designation.

ELINORA Benson, 1946*b* : 35, 39. Type-species: *Allantus dominiquei* Konow, 1894, by original designation.

EOPSIS Benson, 1959*g* : 121. Type-species: *Eopsis beaumonti* Benson, 1959, by original designation.

ERIOTREMEX Benson, 1943*c* : 35, 42. Type-species: *Tremex smithi* Cameron, 1876, by original designation.

GILPINIA Benson, 1939*f* : 341. Type-species: *Lophyrus polytomus* Hartig, 1834, by original designation.

GUIGLIA Benson, 1938*d* : 8. Type-species: *Guiglia bombycinis* Benson, 1938, by original designation.

GRYPONEURA Benson, 1954*h* : 157, 161. Type-species: *Xiphydria quadrimaculata* Cameron, 1899, by original designation.

HALIDAMIA Benson, 1939*a* : 111. Type-species: *Hylotoma affinis* Fallén, 1807, by original designation [cited as *Blennocampa affinis* (Fallén) Enslin].

HAPLOCEPHUS Benson, 1935*f* : 544. Type-species: *Haplocephus aureus* Benson, 1935, by original designation.

HELIORUSSUS Benson, 1955*a* : 16. Type-species: *Heliorussus scutator* Benson, 1955, by original designation.

HINATARA Benson, 1936*d* : 623. Type-species: *Fenusa excisa* Konow, 1885, by original designation.

HYPSATHALIA Benson, 1962*a* : 349. Type-species: *Athalia przevalskyi* Jakovlev, 1887, by original designation.

KULCANIA Benson, 1935*a* : 2. Type-species: *Ophrynopus costaricensis* Bischoff, 1928, by original designation.

LEPTORUSSUS Benson, 1955*a* : 16, 19. Type-species: *Leptorussus africanus* Benson, 1955, by original designation.

MELISANDRA Benson, 1939*a* : 110. Type-species: *Tenthredo morio* Fabricius, 1781, by original designation [cited as *Selandria morio* (Fabricius) Enslin].

MICROCEPHUS Benson, 1935*f* : 545. Type-species: *Monoplopus judaicus* Konow, 1907, by original designation.

NEATEUCHOPUS Benson, 1935*f* : 543. Type-species: *Neateuchopus tigris* Benson, 1935, by original designation.

NEOSYRISTA Benson, 1935*f* : 547. Type-species: *Neosyrista japonica* Benson, 1935, by original designation.

NEPIONEMA Benson, 1960*c* : 173. Type-species: *Nepionema helvetica* Benson, 1960, by original designation.

NOTOFENUSA Benson, 1959*e* : 91. Type-species: *Scolineura surosa* Konow, 1905, by original designation.

ORUSSELLA Benson, 1935*a* : 2. Type-species: *Orussus dentifrons* Philippi, 1873, by original designation.

Benson states that the description of this genus is taken entirely from the descriptions of the species already published by Philippi (1873) and Rohwer (1925).

ORUSSOBAIUS Benson, 1938*d* : 5, 8. Type-species: *Orussobaius mesembrinus* Benson, 1938, by original designation.

PARNA Benson, 1936*d* : 621. Type-species: *Tenthredo* (*Allantus*) *tenella* Klug, 1914, by original designation.

PEDICRISTA Benson, 1935*a* : 2. Type-species: *Pedicrista hyalina* Benson, 1935, by original designation.

PERGAGRAPTA Benson, 1939*g* : 329, 340. Type-species: *Perga bella* Newman, 1841, by original designation.

PERREYIELLA Benson, *in* Benson & Conde, 1938*f* : 124, 131, 132. Type-species: *Lophyrus melanoptera* Perty, 1853, by original designation.

PHYLLOCOLPA Benson, 1960*d* : 60. Type-species: *Nematus leucapsis* Tischbein, 1846, by original designation.

PLATYPSECTRA Benson, 1938*b* : 614, 618. Type-species: *Pterygophorus analis* Costa, 1862, by original designation.

PRIONOMEION Benson, 1939*f* : 341. Type-species: *Lophyrus gaullei* Konow, 1906, by original designation.

PTERYPERGA Benson, 1938*b* : 622. Type-species: *Pteryperga galla* Benson, 1938, by original designation.

RHIPIDOCTENUS Benson, 1954*i* : 115, 117, 118. Type-species: *Rhipidoctenus cinderellae* Benson, 1954, by monotypy.

RHYSACEPHALA Benson, 1954*h* : 157, 158. Type-species: *Xiphydria obtusiventris* Rohwer, 1918, by original designation.

SELJUKIA Benson, 1966*c* : 76. Type-species: *Seljukia tenebrosa* Benson, 1966, by original designation.

STAURONEMA Benson, 1948*a* : 22. Type-species: *Nematus compressicornis* Fabricius, 1804, by monotypy.

Name preoccupied by *Stauronema* Sollas, 1877 (Spongida), see *Stauronematus* Benson, 1953*d* : 153.

STAURONEMATUS Benson, 1953*d* : 153. Type-species: *Nematus compressicornis* Fabricius, 1804.

Replacement name for *Stauronema* Benson, junior homonym of *Stauronema* Sollas, 1877.

STEIROCEPHALA Benson, 1954*h* : 157, 158. Type-species: *Derecyrta reedii* Kirby, 1882, by original designation.

STETHOMOSTUS Benson, 1939*a* : 111. Type-species: *Tenthredo fuliginosus* Schrank, 1781, by original designation.

STYPHELARGE Benson, 1938*e* : 119. Type-species: *Trichorhachus abdominalis* Kirby, 1882, by original designation.

STYRACOTECHYS Benson, 1935*e* : 224. Type-species: *Styracotechys dicelysma* Benson, 1935, by original designation.

WARRA Benson, 1934*i* : 465, 470. Type-species: *Clarissa froggatti* Rohwer, 1922, by original designation.

XIPHIDIAPHORA Benson, 1954*h* : 161. Type-species: *Xiphidiaphora erebus* Benson, 1954, by original designation.

XYELATANA Benson, 1938*a* : 34. Type-species: *Xyela longula* Dalman, 1819, by original designation.

Species-group taxa

Abia plana Benson, 1954*d* : 271. Holotype ♀, HUNGARY: Retyezāth, 1200–1800 ft, 6–7.vi.1937 (*B. Lipthay*) (BMNH, No. 1.674).

Paratypes. 1 ♂, same data as holotype; 1 ♂, same data as holotype except date 24.v.–4.vi.1937 (BMNH).

The right antenna of the holotype is missing.

Acanthoperga marlatti Benson, 1939*g* : 355, 356. Holotype ♀, AUSTRALIA: New South Wales, E. Darrigo, Brooklana [publ. E. Dorrigo, Brooklands], 1929 (*W. Heron*) (AM, Sydney, No. K59211).

The holotype is in good condition.

Acanthoperga melanocera Benson, 1965*c* : 48. Holotype ♀, NEW GUINEA: S.E., Mt Giluwe, 2500 m, 1.v.1963 (*J. Sedlacek*) (BPBM, Honolulu, No. 9850).

The holotype is in good condition. Attached to the holotype is a further label bearing an unpublished manuscript name.

Acherdocerus annulicornis Benson & Conde, 1938*f* : 123, 138. Holotype ♂, BRAZIL: Espirito Santo, Sta. Thereza, 23.xi.1928 (DEI, Eberswalde).

The holotype is in good condition; it has a red rectangular label with the word 'Typus' printed on it. The determination label reads '*Acherdocerus annulicornis* O. Conde. Typus ♂.'

Acherdocerus fabulosus Benson & Conde, 1938*f* : 123, 148. Syntypes 27 ♂, BRAZIL: Espirito Santo, Sta. Thereza and Leopoldina; syntypes 4 ♂, Rio de Janeiro (Sta. Thereza); syntype 1 ♂, Represa Ciganos bei Rio von Souza Lopes, captured mid October to mid January.

Only two syntypes have been traced. The Hungarian Natural History Museum has 1 ♂, labelled '*Acherdocerus fabulosus* Conde, "Typus" ♂.' The data are BRAZIL: Espirito, Sto, Sta. Thereza, 17.x.1928 (*O. Conde*). The Polish Academy of Sciences has 1 ♂, labelled '*Acherdocerus fabulosus*, typus- O. Conde det. 1937.' The data are BRAZIL: Espirito, STO, STA, Thereza, 17.x.1928 (*O. Conde*).

Acherdocerus horni Benson & Conde, 1938*f* : 123, 137. Holotype ♀, BOLIVIA: Mapiri (Coll. Konow) (DEI, Eberswalde).

The holotype has data labels and a red rectangular label with the word 'typus' printed on it. The determination label is '*Acherdocerus horni* Typus ♀, O. Conde, 1933.' The holotype is in good condition except that the right forewing and one leg from the right hand side of the specimen are mounted separately. The remaining legs from the right side of the specimen are missing.

Acherdocerus luederwaldti Benson & Conde, 1938*f* : 123, 145. Holotype ♂, BRAZIL: Sao Paulo, Ypiranga (*Luederwaldt*), 17.ix.1927 (cited as Museu Paulista; I have been unable to confirm the location of the holotype).

Paratype. BRAZIL: 1 ♂, Rio Grande (BMNH).

The paratype is in good condition.

Acherdocerus multiannulatus Benson & Conde, 1938*f* : 123, 150. Syntypes 23 ♂, COSTA RICA: San Jose (*H. Schmidt*).

Only nine syntypes have been located. Eight are housed in the Polish Academy of Sciences. They bear the following labels 'Typus, O. Conde, det. 1937, Costa Rica, N. Shmidt S.' All specimens have the label '*Brachytoma similis* Enderl., typus', attached. One specimen has a label 'similis Malaise det., 1938.' One ♂ syntype is in the Hungarian Natural History Museum and is labelled '*Acherdocerus multiannulatus*' Conde, 'Typus' ♂ 'Costa Rica, San Jose.'

All the located syntypes are in good condition.

Acorduleceros megacephalus Benson, 1940*a* : 463. Holotype ♂, BRAZIL: Pernambuco, 1937 (L. Pyenson, no. 673) (BMNH, No. 1.638).

Paratypes. 1 ♀ (allotype), same data as holotype; 3 ♂, same data as holotype (BMNH).

The holotype has only two segments of the left antenna and four segments of the right antenna remaining.

Aglaostigma aucupariae subsp. ***lacteore*** Benson, 1968*a* : 155. Holotype ♂, TURKEY: Trabzon, Zigana Gecidi, 1650 m, 22.v.1962 (*Guichard & Harvey*) (BMNH, 1.815).

Paratypes. TURKEY: 1 ♂, 1 ♀, Bursa, Uludag, 500 m (*Guichard & Harvey*); 1 ♀, Samsun, 20.vii.1959 (*Guichard*); 1 ♂, Trabzon, Zigana Gecedi, 1650 m, 22.v.1962; 1 ♀, Artvin, 1800 m, 6.vi.1962 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Aglaostigma subalpinum Benson, 1946*b* : 37. Holotype ♀, SWITZERLAND: Valais, Les Haudères, 4000–5000 ft, 6–27.vi.1935 (*J. E. & R. B. Benson*) (BMNH, 1.715).

Paratypes. SWITZERLAND: 1 ♂ (allotype), same data as holotype (BMNH); 1 ♂, Ferpècle, 5000–7000 ft, 21–27.vi.1935 (*J. E. & R. B. Benson*) (BMNH).

The holotype has only two segments of the right antenna and four segments of the left antenna remaining; otherwise it is in good condition.

Amauronematus alberich Benson, 1934*e* : 208. Holotype ♀, BEAR ISLAND: Nordhama, 28.vii.1932 (*D. Lack*) B.M. 1932–37 (BMNH, 1.419).

Paratypes. BEAR ISLAND: 1 ♂ (allotype), same data as holotype except date 23.vi. 1932; 6 ♂, 1 ♀, Royevatnet, 17.vii.1932 (*D. Lack*); 1 ♂, Syvertsentjorna, 12.vii.1932 (*D. Lack*); 1 ♂, Laksvatnet, 23.vii.1932 (*D. Lack*); 1 ♂, Ella Lake, 26.vii.1932 (*D. Lack*).

The holotype is in poor condition. All wings are torn and the right antenna has only seven segments remaining.

Amauronematus alsius Benson, 1935*b* : 32. Holotype ♀, GREAT BRITAIN: Scotland, Inverness-shire, Cairn Gorm Mountains, Lairig Ghru, above 2000 ft, 10.vi.1934 (*J. E. & R. B. Benson*) (BMNH, No. 1.640).

Paratype. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition except that the left antenna has only four segments remaining.

Amauronematus crispus Benson, 1948*b* : 30. Holotype ♀, GREAT BRITAIN: England, Hunts, Woodwalton Fen, 10–11.vi.1947 (*R. B. Benson*) (BMNH, No. 1.687).

Paratypes. GREAT BRITAIN: 2 ♂, 6 ♀, same data as the holotype (BMNH); 1 ♀, England, Devon, Newton Abbot, bred 9.iv.1922, 1 ♀, Bovey Tracey, bred iv. 1923, 1 ♀, 28.v.1914 (*R. C. L. Perkins*) (UM, Oxford); 1 ♀, England, Somerset, Shapwick, 20.v.1923 (*H. A.*) (R. C. L. Perkins Coll.) (UM, Oxford); 1 ♀, England, Herts, Bricket Wood, bred v. 1937, 1 ♀, 31.v.1937) (*R. B. Benson*) (BMNH); 1 ♀, England, Norfolk, King's Lynn (F. D. Morice Coll.) (UM, Oxford); 1 ♀, England, Cambridge (R. C. L. Perkins Coll.) (UM, Oxford); 1 ♀, England, Lancs, Ainsdale, 10.v.1930 (*H. Britten*) (BMNH); 1 ♀, Wales, Glamorgan, Cyrt-yr-ala (*H. M. Hallet*) (R. C. L. Perkins Coll., UM, Oxford); 1 ♀, Scotland, Caithness, Thurso, bred iv. 1935, from larva on *Salix repens* L., iv. 1934 (*R. B. Benson*) (BMNH). HOLLAND: 1 ♀, Den Haag, 5.v.1923 (*J. van der Vecht*) (F. D. Morice Coll., UM, Oxford). SWEDEN: 2 ♀, Skåne, Dalby, 6.v.1938 (*D. M. S. & J. F. Perkins*); 7 ♀, same data except date 13.v.1938; 1 ♀, Glenarp, 14.v.1938 (*D. M. S. & J. F. Perkins*) (BMNH).

The holotype is in good condition except for the left antenna, of which only seven segments remain.

Amauronematus godmani Benson, 1955*d* : 104. Holotype ♀, SWITZERLAND: Valais, Ferpècle, 2100–2400 m, 22.vi.1935 (*J. E. & R. B. Benson*) (BMNH, No. 1.688).

Paratypes. SWITZERLAND: 30 ♂, 11 ♀, same data as holotype (BMNH); 8 ♂, same data as holotype except date 9.vi.1935 (BMNH); 14 ♂, same data except height and date, 1800–2100 m, 14.vi.1935 (BMNH); 30 ♂, 18 ♀, Arolla, 1800–2100 m (*J. E. & R. B. Benson*) (BMNH); 1 ♂, same data except height and date, 2100 m, 18.vi.1935 (*J. E. & R. B. Benson*) (BMNH); 2 ♂, 2 ♀, Arolla, 2500 m, 30.vi.1935 (*J. E. & R. B. Benson*) (BMNH); 1 ♀, Alp du Zaté, 2000 m, 20.vi.1935 (*J. E. & R. B. Benson*); 4 ♂, same data except height and date 2100–2400 m, 7–9.vii.1935 (*J. E. & R. B. Benson*) (BMNH).

The holotype is in good condition.

Amauronematus mcluckiei Benson, 1935*b* : 31. Holotype ♀, GREAT BRITAIN: Scotland, Inverness-shire, Cairn Gorm, above 3000 ft, 27.vi.1934 (*J. E. & R. B. Benson*) (BMNH, 1.642).

Paratypes. GREAT BRITAIN: 1 ♂ (allotype), 3 ♀, same data as holotype; 1 ♀, same data as holotype except date, 29.vi.1932 (*J. E. & R. B. Benson*) (BMNH); 2 ♂, 1 ♀, Scotland, Mount Braeriach, 4000 ft, 25.vi.1934 (*J. E. & R. B. Benson*) (BMNH); 11 ♂, 29 ♀, Scotland, Perthshire, Breadalbane Mountains, above 2500 ft, 31.v.–6.vi.1932) (*R. B. Benson*) (BMNH).

The holotype has only seven segments remaining of the right antenna.

Amauronematus nimbus Benson, 1960*c* : 177. Holotype ♀, SWITZERLAND: Valais, near Verbier, 8000–8500 ft (*J. E. & R. B. Benson*) (BMNH, 1.767).

Paratypes. SWITZERLAND: 3 ♀, same data as the holotype (BMNH); 2 ♂, 1 ♀, Ferpècle, 5000–7000 ft, 9.vi.1935 (*J. E. & R. B. Benson*); 4 ♂, 3 ♀, same data except date 21–27.vi.1935; 2 ♂, 3 ♀, same data except date 14.vi.1935; 5 ♂, same data except height and date, 7000–8000 ft, 22.vi.1935 (*J. E. & R. B. Benson*); 1 ♂, Les Haudères, Alp du Zaté, 6000–8000 ft; 1 ♂, same data except date 10–20.vi.1934; 1 ♂, same data except date 29.vi.1935 (*J. E. & R. B. Benson*); 3 ♂, 9 ♀, Aletschwald 6000–7000 ft (*J. E. & R. B. Benson*); 3 ♂, 9 ♀, same data except date 7–17.vi.1959, 3 ♀, Bettmeralp, 5–16.vi.1959 (*J. E. & R. B. Benson*); 1 ♂, Eggishorn, Marjelenalp, 7–8000 ft; 1 ♂, same data except date 18.vi.1959 (*J. E. & R. B. Benson*) (BMNH).

The holotype is in good condition. Benson states that a sample collection of high alpine sawflies is being deposited in MZ, Lausanne.

Amauronematus perkinsi Benson, 1933*d* : 256. Holotype ♀, GREAT BRITAIN: England, Buckinghamshire, Halton, 24.v.1930 (*R. B. Benson*) (BMNH, 1.641).

Paratypes. GREAT BRITAIN: 1 ♀, England, Devonshire, Dartmoor, bred from larva on *Salix*, 21.iv. 19? (*R. C. L. Perkins*)(UM, Oxford); 1 ♀, England, Hampshire, Lyndhurst, bred from larva on *Salix* (*Miss E. F. Chawner*) (BMNH). The Chawner specimen bears a det. label by Conde '*Amauronematus fasciatus* Konow' and has no antennae. One other specimen bearing a circular yellow-edged paratype label stands in the BMNH collection. It has the following labels '*Amauronematus* Nom in Coll. suo et d.d. 1930, R. C. L. Perkins'; '*Amauronematus perkinsi* Benson Paratype ♀ 1934'; and '*Amauronematus fasciatus* Konow ♀ det. R. B. Benson 1947.'

The holotype data conflicts with the published data and reads as follows: 'Bucks, Dancers End, 29.v.1930, *R. B. Benson*, B.M. 1930–167.' The holotype is in good condition.

Amauronematus rex Benson, 1948*b* : 32. Holotype ♀, GREAT BRITAIN: England, Bucks, Whaddon Chase, bred iii. 1946, from mixed batch of larvae on *Salix atrocinerea* Brot. and ***aurita*** L. collected v. 1945 (*R. B. Benson*) (BMNH, 1.685).

Paratypes. GREAT BRITAIN: 2 ♀, England, Beds, Heath and Reach, Kings Wood, bred 27.iv.1947 on *Salix aurita* L. (*V. H. Chambers*); 1 ♀, England, Great Haldons, 13.iv.1926 (*R. C. L. Perkins*) (not located). IRELAND: 1 ♀, N. Kerry, Kilmarly (*E. F. Bullock*) (not located); 2 ♀, Dumcarban, 11.v.1947; 2 ♀, same data except date 19.v.1947 (*R. C. Farris*) (BMNH); 2 ♀, Lough Mentis, 16.v.1941 (*R. C. Farris*) (BMNH).

The holotype is in good condition except that seven segments only remain of the right antenna. The genitalia are mounted on a slide dated 17.vii.1947.

1 ♀, labelled paratype and not cited in publication, has the following labels 'L. Mentis c.v. 185.41', 'swept off *S. cineria*', '*Amauronematus rex* Benson 1948' and '*Amaur tillbergi* Mal. det. Lindqvist 1948.'

Amonophadnus nigripennis Benson, 1935*c* : 172. Holotype ♀, JAVA: west, Tapos, Mount Gedeh, 1000 m, 20–26.i.1933 (*J. van der Vecht*) (RNH, Leiden).

The holotype is in good condition and the saw is mounted on a slide.

Amonophadnus pullus Benson, 1935*c* : 173. Holotype ♀, JAVA: west, Rarahan, Mount Gedeh, 1375 m, 21.vi.1932 (*H. R. A. Muller*) (RNH, Leiden).

The holotype is in good condition and the saw is mounted on a slide.

Anapeptamena rugafrons Benson, 1935*c* : 176. Holotype ♀, JAVA: tea plantation, Negla, 1700 m, 1916 (*R. Menzel*) (Dr Ch. Ferrière Coll.) (BMNH, 1.260).

The holotype is in good condition except for the right antenna, which is missing.

Ancyloneura annulicornis Benson, 1934*i* : 472, 473. Holotype ♀, NEW GUINEA: (*A. R. Wallace*) (BMNH, 1.468).

The holotype has the antennae missing. Benson states that this specimen is in very bad condition and figured by W. F. Kirby, 1882, p. 95, pl. vii, fig. 7, and that the antenna in fig. 7a has segment three drawn much too long in comparison with the other segments.

Ancyloneura brevisetosa Benson, 1934*i* : 472,473. Holotype ♀, NEW GUINEA: south-east, Moroka, 1300 m, Loria, vii.–xi. 1893 (MCSNGD, Genoa).

Paratype. 1 ♂ (allotype), same data as holotype (BMNH).

The holotype is in good condition; it bears the following label '*Clarissa guinensi* n. sp. Allotypus ♀, R. Forsius det.'

Ancyloneura frontalis Benson, 1965*c* : 45. Holotype ♂, NEW GUINEA: Vogelkop, Bomberi, 700–900 m, 4.vi.1959 (*J. L. Gressitt*) (BPBM, Honolulu, 9806).

Paratypes. NEW GUINEA: 2 ♂, same data as holotype (BMNH); 1 ♂, same data as holotype (BPBM, Honolulu); 1 ♂, Pak Pak, S. Coast of Bomberai, 10–1000 m, 1 ♂, 3.vi.1959 (*T. C. Maa*) (BPBM, Honolulu); 1 ♂, Manokwari, 75 m, 19–21.vii.1957 (*D. Elmo Hardy*) (BPBM, Honolulu).

The holotype is in good condition.

Ancyloneura fuscipennis Benson, 1934*i* : 471, 472. Holotype ♀, NEW GUINEA: (Coll. P. Magretti) (*B. Humboldt*) (MCSNGD, Genoa).

Paratype. 1 ♂ (allotype) (A. R. Wallace Coll.) (BMNH).

The holotype is in good condition.

Anoplonyx destructor, Benson, 1952*c* : 544. Holotype ♀, GREAT BRITAIN: England, Herts, Tring, 21.v.1942 (*R. B. Benson*) (BMNH, 1.683).

Paratypes. GREAT BRITAIN: 156 ♀ from Devon; Gloucester; Sussex; Surrey; Berks; Bucks; Herts; Cumberland; Northumberland; Montgomery; Perthshire and Inverness, v–vi (BMNH).

The holotype is in good condition. Of the original total only 130 paratypes are now in the BMNH collection.

Antargidium allucente Benson, 1934*h* : 230. Holotype ♀, AUSTRALIA: Queensland, near Springsure, Meteor Donns, 18.xi.–3.xii.1930 (*I. M. Mackerras*) (ANIC, Canberra).

Paratype. 1 ♀, same data as holotype (BMNH).

The holotype is in reasonable condition.

Antargidium atriceps Benson, 1935*e* : 212, Holotype ♀, AUSTRALIA: New South Wales, Tambourine, 21.ii.1927 (*H. Hacker*) (QM, Brisbane, T. 5931).

Paratypes. AUSTRALIA: 1 ♂ (allotype), same data as holotype (minus head) (QM Brisbane, T. 5933); 1 ♀, Conondale, 7.i.1930 (*H. Hacker*) (BMNH); 1 ♀, Queensland National Park, xi. 1920 (*H. Hacker*) (QM, Brisbane, T.5932).

The holotype is in poor condition; the right wings and the antennae are missing. The genitalia were mounted on a slide which cannot now be located.

Antargidium dentivalvis Benson, 1934*h* : 231. Holotype ♀, AUSTRALIA: Queensland, Townsville, 4.xi.1903 (*F. P. Dodd*) (R. E. Turner Coll.) (BMNH, 1.109).

Paratype. 1 ♂ (allotype), same data as holotype (BMNH).

The holotype is in fair condition; the right antenna is missing, the wings are crumpled and the mid right tarsus is missing

Antargidium rufum Benson, 1935*e* : 213. Holotype ♀, AUSTRALIA: New South Wales, Toolom, i. 1920 (*H. Hacker*)(QM, Brisbane, T. 5934).

Paratypes. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition. The genitalia were mounted on a slide which cannot now be located.

Antiperga clarki Benson, 1939*g* : 351, 352. Holotype ♀, AUSTRALIA: Western Australia, Perth (*J. Clark*) (QM, Brisbane, T. 5941).

The holotype is in good condition and the genitalia are mounted on a slide. Attached to the holotype is a label '*Perga clarki*' in Benson's handwriting.

Antiperga enslini Benson, 1939*g* : 351, 352. Holotype ♀, AUSTRALIA: Western Australia, Perth, 25.ii.–12.iii.1936 (BMNH, 1.522).

Paratypes. 18 ♀, same data as holotype (BMNH); 1 ♂ (allotype), 2 ♀, 16.–29.iii.1936, 'on Melaleuca' (*R. E. Turner*) (BMNH).

Although not so published by Benson (1939*g*), the following specimens labelled as paratypes of *Antiperga enslini* Benson have been located. AUSTRALIA: 1 ♂, Western Australia, Swan R., Oct. 1919 (*J. Clark*) (QM, Brisbane, T. 5943); 1 ♀, West Australia, Perth, 25.ii.–12.iii.1936 (*R. E. Turner*), labelled 'Pergama enslini' by Benson (QM, Brisbane, T5944); 1 ♀, Perth, 25.ii.–12.iii.1936 (*R. E. Turner*) (NMV, Melbourne, T. 4377); 1 ♂, 2 ♀, W. A. Perth (*G. H. Hardy*) (AM, Sydney, K41777).

The right antenna of the holotype is missing.

Arge clavicornis subsp. ***seljuki*** Benson, 1968*a* : 127. Holotype ♀, TURKEY: Trabzon, Zigana Dagi, 1400 m, 13.vii.1960 (*Guichard & Harvey*) (BMNH, 1.808).

Paratype. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Arge stecki Benson, 1939*b* : 114. Holotype ♀, SWITZERLAND: Valais, Val d'Herens, Ferpècle, 6,000 ft, 14.vi.1935 (*J. E. & R. B. Benson*) (BMNH, No. 1.829).

Paratype. 1 ♂ (allotype), same data as the holotype except height and date, 5–7000 ft, 21–27.vi.1935 (BMNH).

Benson has in error labelled both specimens as paratypes. As only one ♂ and one ♀ were described and the data and sex of both agree with the published data, it is clear that the ♀ specimen is actually the holotype; it has been labelled accordingly. The holotype has a label 'genitalia mounted on a slide'; on the reverse side of this label is the date '13.iv.39(3).' The only slide dissection of this species in the BMNH collection is that labelled 'SWITZERLAND: Valais, Les Haudères, 4–5000 ft, vi. 1935. *R. B. Benson*, 13.iv. 1939 (3).' As the dissection numbers correlate it is assumed that the wrong data was put on the slide label.

The holotype is in good condition.

Athalia armata Benson, 1961*d* : 19. Holotype ♂, UGANDA: Ruwenzori Range, Memwamba Valley, xi. 1934–i. 1935 (*F. W. Edwards*) (BMNH, No. 1.781).

Paratypes. RWANDA: 1 ♀, Lac Karago, 21.iii.1936 (*L. Lippens*) (MRAC, Tervuren); 3 ♂, 1 ♀, Kundhurn ya Tshuve, Rutabagwe, 2600 m, 13–14.ix.1934 (Coll. Gahinga-Sabinyo); Nyabitsindi (entre volc. Vishoke-Musule), 2400 m, 18.ii.1935; 1 ♂, Lac N'Gando (volc. Karisimbi), 2400 m, 1 ♂, 7–23.1.1935 (*G. F. De Witte*).

Athalia asbolos Benson, 1961*d* : 18. Holotype ♀, ZAIRE: Parc National Albert, N.-E. N'Gando 2400 m, Kihorwe, 7–12.iii.1935 (*G. F. De Witte*) (MRAC, Tervuren).

The holotype is in good condition.

Athalia birmanica Benson, 1962*a* : 369,372. Holotype ♀, BURMA: north-east, Kambaiti, 7000 ft, 1.iv.–9.vi.1934 (*R. Malaise*) NR, Stockholm).

Paratypes. 9 ♂, same data as the holotype (NR, Stockholm); 6 ♂, same data as the holotype (BMNH).

The holotype is in good condition.

Athalia brevicornis Benson, 1962*a* : 358,361. Holotype ♀, LESOTHO: Maseru, 7.i.1953 (*C. Jacot-Guillarmod*) (BMNH, No. 1.773).

Paratypes. RHODESIA: 2 ♀, Khami, 9.xi.1938 (*G. Arnold*) (BMNH). SOUTH AFRICA: 1 ♂, 1 ♀, Cape Province, Aliwal North, xii. 1922 (*R. E. Turner*) (BMNH).

The holotype has only two segments remaining of the left antenna. The mid and hind right legs are damaged.

Athalia cerebus Benson, 1961*d* : 16. Holotype ♀, ETHIOPIA: Addis Ababa, 8000 ft, 28.vii–15.viii.1945 (*K. M. Guichard*) (BMNH, No. 1.779).

Paratypes. ETHIOPIA: 1 ♀, same data as the holotype (BMNH); 1 ♀, Goré, 6000 ft, 1.iii.1948 (*K. M. Guichard*) (BMNH). RWANDA: 1 ♀, Rwankuba (Kisenyi), 2200 m, 28.viii.1953 (*A. E. Bertrand*) (MRAC, Tervuren).

The holotype is in good condition; the left hind leg is glued separately to the polyporus mount.

Athalia circularis subsp. ***melanoptera*** Benson, 1962*a* : 365. Holotype ♂, CHINA: Manchuria, Harbin, 1.viii.1943 (*P. Alin*) (BMNH, No. 1.778).

Paratypes. CHINA: 1 ♂, same data as the holotype (BMNH). INDIA: 1 ♂, Kashmir, 5–6000 ft, v. 1901 (*C. G. Nurse*) (BMNH).

The holotype is in poor condition; the left wings are torn and the right mid leg is missing.

Athalia cordata subsp. ***kashmirensis*** Benson, 1932*a* : 187. Holotype ♀, INDIA: Kashmir, Gulmarg, vii. 1931 (*T. Bainbrigge Fletcher*) (BMNH, No. 1.313).

Paratypes. INDIA: 1 ♂, Assam, Shillong, ix. 1903 (*R. E. Turner*) (BMNH); 1 ♂, 1 ♀, Kashmir, 6000–7000 ft, v. 1905 (*C. G. Nurse*) (BMNH).

The holotype is in good condition.

Athalia cornubiae Benson, 1931*a* : 110. Holotype ♀, GREAT BRITAIN: England, Cornwall, Looe, ix. 1922 (*C. G. Champion*) (BMNH, No. 1.820).

Paratypes. ITALY: 1 ♀, Gaeta, 24.iv.1895 (*F. D. Morice*) (UM, Oxford). FRANCE: 1 ♀, Plaine Madalaine, 2000 m, 6. vi. (UM, Oxford,). SPAIN: 1 ♀, Corrodonga (*Dusmet*); 1 ♀, Sierra Nevada, vi. 1926, (*Dusmet*); 1 ♀, Villaverd, 10.iv.1907 (*Dusmet*) (at the time of publication these specimens were deposited in Dr Jose M. Dusmet's private collection in Madrid).

The holotype has both antennae missing.

Athalia cuspidata Benson, 1954*d* : 277. Holotype ♀, ISRAEL: Jerusalem, 16.iv.1943 (*H. Bytinski-Salz*) (BMNH, No. 1.708).

Paratypes. 1 ♀, same data as the holotype (BMNH); 1 ♂, same data as the holotype except date 1.v.1941 (BMNH); 2 ♀, same data as the holotype except date 7.v.1943 (Bytinski-Salz Collection) not located.

The holotype is in good condition.

Athalia dulcis Benson, 1961*g* : 10. Holotype ♀, ZAIRE: Parc National de l'Upemba, Lusinga 1700 m, (MRAC, Tervuren).

Paratypes. ZAIRE: 1 ♂, riv. Dipidi, 1–8.xii.1947 (BMNH). 1 ♂, 10.i.1948 (MRAC, Tervuren).

The holotype is in good condition.

Athalia fuscata Benson, 1962*a* : 379,380. Holotype ♀, KENYA: Aberdare Range, 27.x.1934 (*F. W. Edwards*) (BMNH, No. 1.769).

Paratypes. KENYA: 2 ♀, south-east slopes of Mount Kenya, at edge of forest, 6000–7000 ft, 3–12.ii.1911 (*S. A. Neave*) (BMNH); 1 ♀, Teita Hills, (S.) viii. 1947 (*Van Someren*) (BMNH); 2 ♀, Nyeri, x. 1948 (*Van Someren*) (BMNH). RHODESIA: 1 ♀, Vumba Mountains, Umtali, 19.i.1955 (*B. Stuckenberg*) (NM, Natal); 1 ♀, Chirinda Forest, Mt Selinda, 25.i.1955 (*B. Stuckenberg*) (BMNH) (NMP, Pietermaritzburg).

The holotype is in good condition.

Athalia glabricollis subsp. ***meridiana*** Benson, 1954*d* : 279. Holotype ♀, IRAN: Suva (Escalera Coll.) (BMNH, No. 1.709).

Paratypes. IRAN: 2 ♂, 7 ♀, same data as the holotype (BMNH). TURKEY: 1 ♀, Ockmen, 12.viii.1939 (*F. S. Bodenheimer*) (BMNH); 1 ♂, Aksehir, 8.viii.1951 (Wahrman Coll.). ISRAEL: 2 ♂, 2 ♀, Jaffa, 24.ii.1951 (H. Bytinski-Salz Coll.). JORDAN: 1 ♂, Jericho, 3.iv.1943 (*H.* Bytinski-Salz Coll.); 1 ♀, Al Maghtas, 24.ii.1942 (H. Bytinski-Salz Coll.).

The holotype is in good condition.

Athalia guillarmodi Benson, 1956*d* : 412. Holotype ♀, LESOTHO: Mamathes, near Teyateyaneng, 4.xi.1951 (*C. Jacot-Guillarmod*) (BMNH, No. 1.828).

Paratypes. LESOTHO: 3 ♀, 26 ♂, Mamathes near Teyateyaneng, 14.ii–21.iii. and 14.xi.1950–1952 (*C. Jacot-Guillarmod*) (BMNH); 1 ♂, Mokhotlong, 7000 ft, 6.iv.1951, loc. No. 266 (Coll. Swedish S. Afr. Exp.) (UZI, Lund). SOUTH AFRICA: 1 ♂, 2 ♀, Cape Province, Pondoland, Port St. John, 7–13.viii.1923 (*R. E. Turner*) (BMNH); 1 ♂, Cape Province, Lady Grey, 10.xii.1926 (R. I. Nel Coll.) (BMNH); 1 ♂, Cape Province, Katberg, 4000 ft, xii. 1932 (*R. E. Turner*) (BMNH); 1 ♀, Cape Province, Burgherdorp, 1865 (Dr Kannepeyer Coll.) (BMNH); 2 ♀, Natal, Cedara, xii. 1919 (*R. E. Turner*) (BMNH); 1 ♀, Natal, Kloof, 1500 ft, viii. 1926 (*R. E. Turner*) (BMNH); 1 ♀, Natal, Drakensburg, 4800 ft, 28.ii.1929 (*H. Scott*) (BMNH); 1 ♀, Natal, Royal National Park, Tugela Valley, 5000 ft, 11.iv.1951, loc. No. 271 (Coll. S.Afr. Exp.) (UZI, Lund). RHODESIA: 1 ♀, Inyanga, xi. 1933 (*A. Cuthbertson*) (BMNH).

The holotype is in good condition.

Athalia himantopus subsp. ***obsoleta*** Benson, 1962*a* : 378. Holotype ♀, ETHIOPIA: Addis Ababa, 7000 ft, 30.xi–13.x.1945 (*K. M. Guichard*) (BMNH, No. 1.771).

Paratypes. 8 ♂, 7 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Athalia hummeli Benson, 1932*c* : 528. Holotype ♀, CHINA: South Kansu (*Dr Hummel*) (NR, Stockholm).

The holotype is in good condition and the genitalia are mounted on a slide.

Athalia indiana Benson, 1962*a* : 364, 366. Holotype ♀, INDIA: Chakrata, Bodyar, 8000 ft, 21.vi.1923 [publ. as 22.vi.1923] (*C. F. E. Beeson*) (BMNH, No. 1.772).

Paratype. INDIA: 1 ♂, Lambatach, 7600 ft, 9.vi.1924 (*B. M. Bhatia*) (BMNH).

The holotype is in poor condition; the left antenna, left foreleg and mid and hind tarsi are missing. The right fore leg and right hind tarsus are also missing.

Athalia limpopo Benson, 1962*a* : 373. Holotype ♀, MOZAMBIQUE [publ. as S.E. Africa]: Delagoa Bay (BMNH, No. 1.774).

The holotype has both antennae missing. It has a label 'genitalia of this species mounted on a slide 30.viii.60/3.'

Athalia lugens subsp. ***kansuensis*** Benson, 1932*a* : 186. Holotype ♀, CHINA: S. Kansu, Lan Shan, 20.vi.1930 (*Dr Hummel*) (NR, Stockholm).

Paratype. CHINA: 1 ♀, S. Kansu, Lan Shan, 20.vi.1930 (*Dr Hummel*) (BMNH).

The holotype is in good condition.

Athalia mellis Benson, 1962*a* : 373, 375. Holotype ♀, SOUTH AFRICA: Natal, Biggarsberg, 15.x.1958 (*A. H. Newton*) (BMNH, No. 1.775).

Paratypes. SOUTH AFRICA: 11 ♂, 9 ♀, 1 ♂ and 1 ♀ in copula, same data as the holotype (BMNH); 1 ♂, 1 ♀, Natal, Van Reenen, Drakensberg, 6500–7500 ft, x. 1926 (*R. E. Turner*) (BMNH); 1 ♂, same data except date xi. 1926; 1 ♂, same data except date xii. 1926 (BMNH); 1 ♂, Natal, Pietermaritzburg, 27.iii.1955 (*B. Stuckenburg*) (BMNH); 1 ♀, same data except date ix. 1959 (NM, Natal); 2 ♂, Natal, Edensdale, 1.i.1953 (*E. McCallan*) (BMNH) (NMP, Pietermaritzburg); 1 ♀, Natal, Kloof, 1500 ft, ix. 1926 (*R. E. Turner*) (BMNH); 1 ♂, Transvaal, Sabie, i. 1952 (*Inmph*) (ZSBS, Munich); 2 ♂, Zululand, Eshowe, 23–30.iv.1926 (*R. E. Turner*) (BMNH); 1 ♂, 2 ♀, Zululand, Mtunzini, 15.ix. 1949 (*A. L. Capener*) (BMNH); 1 ♀, Zululand, Nqutu, 19.v.1955 (*A. H. Newton*) (BMNH); 1 ♂, Orange Free State, Harrismith, ii. 1927 (*R. E. Turner*) (BMNH); 1 ♀, Orange Free State, Witzieshoek, 6100 ft, 23.ii.1929 (*Hugh Scott*) (BMNH); 1 ♂, 2 ♀, Cape Province, Umtata, Transkei, 18.ii.–18.iii.1923 (*R. E. Turner*) (BMNH); 1 ♂, Cape Province, Grahamstown, i. 1954 (*F. Zumpf*) (ZSBS, Munich); 1 ♂, same data except date 6.ii.1952, 1 ♂, same data except date ix. 1954 (*E. McCallan*) (AMG, Grahamstown); 1 ♀, Cape Province, Katburg, 4000 ft, x. 1932 (*R. E. Turner*) (BMNH); 1 ♀, Cape Province, Pondoland, Port St. John, 10–31.vii.1923 (*R. E. Turner*) (BMNH); 1 ♀, Cape Province, Durban, 1902 (*F. Muir*) (BMNH); 3 ♂, Cape Province, Port Elizabeth, Lovemore Park, on *Salvia*, 9.viii.1956 (*J. S. Taylor*) (AMG, Grahamstown). LESOTHO: 1 ♀, Hensley's Dam, Leribe, 19.ii.1948 (*C. Jacot-Guillarmod*) (BMNH).

The holotype is in good condition.

Benson states 'the specimens in the B.M. collected by F. Muir and R. E. Turner and examined by Forsius (1931) were labelled and recorded by him as *Athalia incomta* Konow'.

Athalia nigromaculata subsp. ***sikkimensis*** Benson, 1932*c* : 530. Holotype ♀, SIKKIM: Lachen, 9000 ft, 26.iv.1924 (BMNH, No. 1.318).

The holotype has only two segments of the left antenna remaining and the left hind tarsus is missing.

Athalia picta Benson, 1962*a* : 364,366. Holotype ♀, CHINA: South Kansu, Lu-pa-sze, 11.vi.1930 (*Dr Hummel*) (NR, Stockholm).

Paratypes. 1 ♂, same data as the holotype, in copula with the holotype (NR, Stockholm); 3 ♀, same data as the holotype (NR, Stockholm); 2 ♀, same data as the holotype (BMNH).

Although Benson lists the above depositories in his paper the BMNH collection has 3 ♀ from the paratype series.

The holotype does not have a type number and is in good condition.

Athalia pluto Benson, 1961*d* : 16. Holotype ♀, KENYA: Nanyuki, v. 1948 (*Van Someren*) (BMNH, No. 1.780).

Paratypes. KENYA: 1 ♀, same data as the holotype (BMNH); 1 ♀, Teita Hills, viii. 1947 (*Van Someren*) (BMNH); 1 ♂, south-east slopes of Mount Kenya, 6000–7000 ft, 3–12.ii.1911 (*S. A. Neave*) ("*Athalia clavata* det. Forsius') (BMNH). UGANDA: 1 ♀, Bugishu, 14.i. 1930 (*H. Hargreaves*) (BMNH). ZAIRE: 2 ♂, Kivu, Mt Itombwe Mulunghe, 2250 m, iv. 1958 (*J. Pasteels*) (BMNH): 2 ♀, Parc National Albert, lac Gando, 2400 m, 6–8.iii.1935 (*Mission G. F. de Witte*) (MRAC, Tervuren). RWANDA: 3 ♀, Lac Karago, 21.iii.1936 (*L. Lippens*) (MRAC, Turveren); 2 ♀, Kagogo, 1900 m, Terr. Ruhengeri, 21.i.1953 (*P. Basilewsky*) (MRAC, Tervueren); 5 ♀, gite de Nkuli, 17.iii.1936 (*L. Lippens*) (MRAC, Tervuren); 1 ♀, Beni a Lesse, fin vii. 1911 (*Dr Martula*) (MRAC, Tervuren); 1 ♀, Terr. Rutshuru, viii. 1937 (*Mission Prophylactique*) (MRAC, Tervuren).

The holotype has the right tibia and tarsus of the fore leg missing.

Athalia pulla Benson, 1961*d* : 19. Holotype ♀, ZAIRE: Parc National Albert, Shamuheru volc. Nyamuragira) 1843 m, 14–26.vi.1935 (*Mission G. F. de Witte*) (MRAC, Tervuren).

Paratype. RWANDA: 1 ♀, Ruhengeri, riv. Penge, 1800–1825 m, 29.ix.1934 (*Mission G. F. de Witte*) (MRAC, Tervuren).

The holotype is in good condition.

Athalia schweinfurthi subsp. ***atripennis*** Benson, 1962*a* : 379,380. Holotype ♀, KENYA: Mt Elgon, 10 500–13 000 ft, on flower heads of *Senecio elgonensis* Th. Fries, ii. 1935 (*F. W. Edwards*) (BMNH, No. 1.770).

Paratypes. KENYA: 1 ♀, Mt Elgon, 14 000 ft, ii. 1935 (*F. W. Edwards*) (BMNH); 1 ♂, Mt Elgon, 12 000 13 000 ft, ii. 1935 (*F. W. Edwards*) (BMNH); 1 ♀, Mt Elgon, 8800 ft, 6.v.1952 (*G. Arnold*) (BMNH); 1 ♀, Aberdare Range, Nyeri Track, 10 500–11 000 ft, 13.v.1934 (*F. W. Edwards*) (BMNH); 1 ♂, Elgon cratère, Maji Ya Moto, 3460 m, xii. 1953 (*N. Leleup*) (MRAC, Tervuren).

The holotype is in good condition.

Athalia umbrosa Benson, 1962*a* : 374, 376, 377. Holotype ♀: UGANDA: Ruwenzori Range, xii.1934–i.1935 (*F. W. Edwards*) (BMNH, No. 1.776).

Paratypes. UGANDA: 1 ♀, Mt Elgon, Butandiga, 7000 ft, 1935 (*J. Ford*) (BMNH). RWANDA: 1 ♀, Blumba, 2300 m, 6.xi.1953 (*P. Basilewsky*) (MRAC, Tervuren). ZAIRE: 1 ♀, Kivu, Buranga, 5.xii.1925 (*H. Schouteden*) (MRAC, Tervuren).

The holotype is in good condition.

Athalia xantha Benson, 1962*a* : 364, 365. Holotype ♀, SOUTH AFRICA: Natal, Weenan, ix.–x. 1925 (*H. P. Thomasset*) (BMNH, No. 1.777).

The holotype is in good condition.

Athetocephus maculatus Benson, 1935*f* : 549. Holotype ♂, MADAGASCAR: Region du Sud-est, Fort-Dauphin, 1901 (*Ch. Alluaud*) (MNHN, Paris).

The holotype is in good condition.

Athetocephus madecassus Benson, 1935*f* : 548. Holotype ♀, MADAGASCAR: Valies du Sombirano, vii. 1932 (*Mellis*) (BMNH, No. 1.15).

Paratypes. 3 ♂ (including allotype), same data as the holotype (MNHN, Paris); 3 ♂, same data as the holotype (MNHU, Berlin).

The holotype has only two segments of each antenna remaining. The genitalia of the holotype are mounted on a slide together with the mouthparts. A further slide has the right fore and hind wings of a ♂ paratype mounted on it.

Atholophorus puncticeps Benson, 1935*c* : 177, 178. Holotype ♀, JAVA: west, Tapos, Mount Gedeh, 800 m, 13–19.iii.1933 (*J. van der Vecht*) (RNH, Leiden).

Paratype. JAVA: ♂ (allotype), west, Tapos, Mount Gedeh, 800 m, vii. 1932 (*L. G. E. Kalshoven*) (BMNH).

The holotype is in good condition and the genitalia are mounted on a slide.

Blennocampa dyari Benson, 1930*a* : 107.

Replacement name for *Blennocampa spiraceae* Dyar, 1895, junior primary homonym of *Blennocampa spiraceae* Brischke, 1883.

Calameuta festiva Benson, 1954*d* : 270. Holotype ♀, CYPRUS: Yerasa, 1000 ft, 2.iv.1945 (*G. A. Mavromoustakis*) (BMNH, No. 1.653).

The holotype has the right antenna, fore tibiae and tarsi missing.

Camptoprium albilabris Benson & Conde, 1938*f* : 123, 130. Holotype ♂, BRAZIL: S. Paulo, Campos do Jordao (*Luederwaldt*) (cited as Museu Paulista).

The holotype has not been located but a slide preparation made from the holotype has been located in the DEI, Eberswalde. It has one penis valve at one end of the slide belonging to *Camptoprium albilabris* and at the other end of the slide is the penis valve of *Camptoprium atriceps* Konow. The label attached to the slide reads '*Camptoprium albilabris* Conde. Typus penis Campos de Gerdao, S. Paulo. Luederwaldt leg. 1906'.

Camptoprium malaisei Benson & Conde 1938*f*: 123,130. Holotype ♀, BRAZIL: Bahia (NR, Stockholm).

The holotype is in good condition and bears a label written by R. Malaise '*Camptoprium malaisei* Conde. Type'.

Cephalocephus xanthus Benson, 1946*c* : 100. Holotype ♀, BURMA: north-east, Kambaiti, 7000 ft, 25.v.1934 (*R. Malaise*) (NR, Stockholm).

The holotype is in good condition.

Characopygus decoratus Benson, 1968*a* : 119, 120. Holotype ♀, ISRAEL: near Jerusalem, Ejn, Karim, 20.iii.1959 [publ. as 10.iii.1959], (*H. Bytinski-Salz*) (BMNH, No. 1.807).

Paratype. ISRAEL: 1 ♂, Holou, 28.iii.1959 (*H. Bytinski-Salz*) (BMNH).

The holotype is in good condition.

Cheilophleps xantha Benson, 1938*f* : 238,239. Holotype ♂, AUSTRALIA: New South Wales, Bulga, 22.ix.1926 (*W. W. Froggatt*) (BMNH, No. 1.590).

Paratypes. AUSTRALIA: 1 ♂ same data as the holotype (BMNH); 2 ♂, same data as the holotype (W. F. Froggatt's Coll.); 5 ♂, same data as the holotype (ANIC, Canberra); 1 ♀ (allotype), East Dorrigo, 3.xii.1929 [publ. as 3.xiii.1924] (*W. Heron*) (AM, Sydney).

The holotype has only two segments remaining of the left antenna; the left front tarsus and the right front leg are missing.

Additional to the published information, in the BMNH collection are 1 ♂, 1 ♀, same data as the holotype and mounted on the same card. 1 ♂, same data as the holotype, is on a separate mount.

Cladomacra nigriceps Benson, 1965*c* : 46. Holotype ♂, NEW GUINEA: Papua, Owen Stanley Range, Goilala Bome, 1950 m, 16–31.iii.1958 (*W. W. Brandt*) (BPBM, Honolulu, No. 9807).

Paratypes. NEW GUINEA: 2 ♂, same data as the holotype (BMNH); 1 ♂, N. E. Finisterre Range, Saidor, Matoko, 28.viii–5.ix.1958 (*W. W. Brandt*) (BPBM, Honolulu); 1 ♂, N.E., Mt Kaindi, 2400 m, in mercury vapour light trap, 27.i.1963 (*J. Sedlacek*) (BPBM, Honolulu); 1 ♂, Moife, 2100 m, 15 km N.W. of Okapa, 7–14.x.1959 (*T. C. Maa*) (BPBM, Honolulu); 1 ♂, N.E., Tomba, Slopes of Mt Hagen, 2500–2650 m, 24.v.1963 (*J. Sedlacek*) (BMNH); 1 ♂, S.E., Mt Giluwe, 2500–2750 m, 30.v.1963 (*J. Sedlacek*) (BPBM, Honolulu).

The holotype is in good condition.

Clarissa antennata Benson, 1935*e* : 217. Holotype ♂, AUSTRALIA: Queensland, Tamborine Mountain (*W. H. Davidson*) (QM, Brisbane, No. T.5940).

The holotype is in good condition.

Clarissa diana Benson, 1935*e* : 216. Holotype ♂, AUSTRALIA: Queensland, Nanango District, xi. 1927 (*H. Hacker*) (QM, Brisbane, No. T5937).

The holotype has the head missing.

Clarissa flammea Benson, 1935*e* : 214. Holotype ♀, AUSTRALIA: Queensland National Park, 25.x.1923 (*H. Hacker*) (QM, Brisbane, No. T.5935)

The holotype is in good condition; the genitalia are mounted on a slide.

Clarissa flavicornis Benson, 1934*i* : 469. Holotype ♀, AUSTRALIA: Queensland, Eidsvold, x. 1929–iv. 1930 (*T. L. Bancroft*) (ANIC, Canberra).

The holotype is in good condition; no numbers have been attached.

Clarissa lucida Benson, 1935*e* : 216. Holotype ♂, AUSTRALIA: New South Wales, Tooloom, i. 1926 (*H. Hacker*) (QM, Brisbane, No. T.5936).

Paratype. 1 ♂, same data as the holotype (BMNH).

The holotype has the abdomen missing.

Clarissa hebe Benson, 1063*a* : 83. Holotype ♀, AUSTRALIA: Western Australia, Tambrey, 29.vii.1958 (*A. Douglas*) (WAM, Perth, WAM. No. 64–7).

Paratypes. 4 ♂, 8 ♀, same data as the holotype (WAM, Perth); 1 ♂, 2 ♀, same data as the holotype (BMNH).

The holotype is in good condition. It is listed on p. 40 of the Western Australian Museum's Annual Report for 1963–64.

Clarissa obscura Benson, 1939*e* : 218. Holotype ♂, AUSTRALIA: Queensland, Tamborine Mountain (*W. H. Davidson*) (QM, Brisbane, No. T.5938).

Paratypes. AUSTRALIA: 1 ♂, same data as the holotype (BMNH); 1 ♂, same data as holotype (QM, Brisbane, No. T.5939); 1 ♂, Brisbane, 7.xii.1924 (*H. Hacker*) (BMNH).

The holotype is in good condition.

Clarissa ruficollis Benson, 1934*i* : 470. Holotype ♀, AUSTRALIA: Federal Capital Territory, Blundells, 26.ix.1930 (ANIC, Canberra).

Paratypes. 2 ♀, same data as the holotype except dates, 10.x.1930 and 21.i.1931 (*L. F. Graham*) (BMNH); 1 ♀, same data as holotype except date, 15.ii.1929 (*G. F. Hill*) (ANIC, Canberra).

The holotype is in fair to good condition.

Clarissa wilsoni Benson, 1938*g* : 360. Holotype ♀, AUSTRALIA: New South Wales, Mt Wilson, x. 1930 (*F. E. Wilson*) (NMV, Melbourne).

The holotype is in good condition. The F. E. Wilson collection was donated to the National Museum of Victoria after his death in 1960.

Corynis fulvicrus Benson, 1954*d* : 275, 276. Holotype ♀, ALGERIA: Hamman Ben Hadjar, 31.iii.1910 (*F. D. Morice*) (BMNH, No. 1675).

Paratype. ALGERIA: 1 ♀, Misserghim, 1929 (*Alluaud & Jeanell*) (MNHN, Paris).

The holotype has both antennae missing. Another ♀, from ALGERIA: Chellala, 1895 (*de Vauloger*) (MNHN, Paris), agrees with the type in colour and structure except that the whole punctation is sparser.

Corynis haematica Benson, 1968*a*: 130, 132. Holotype ♂, ISRAEL: Wadi Ajram, 7.iv.1954 [publ. 7.v.1954] (*H. Bytinsky-Salz*) (BMNH, No. 1.809).

The holotype is in good condition.

Corynis reticulata Benson, 1954*d* : 273. Holotype ♂, ISRAEL: Shapat near Jerusalem, 27.iii.1918 (*E. E. Austin*) (BMNH, No. 1.676).

The holotype is in good condition. The data labels bear a number '1916 52' with a pin-hole interposed between the 6 and 5.

Diphamorphos pallicornis Benson, 1935*e* : 218. Holotype ♀, AUSTRALIA: New South Wales, Tooloom, i. 1926 (*H. Hacker*) (QM, Brisbane, No. T.5948).

Paratype. 1 ♀, same data as the holotype (BMNH).

The head of the holotype is missing.

Dolerus alpinus Benson, 1947*a* : 63. Holotype ♂, SWITZERLAND: Les Haudères, Alp du Zaté, 6–8000 ft, 10–20.vi.1935 (*J. E. & R. B. Benson*) (BMNH, No. 1.682).

Paratypes. SWITZERLAND: 8 ♀, same data as the holotype except height and date 4500 ft, 10–20.vi.1935 (BMNH); 1 ♀, Valais, Ferpècle, 6–7000 ft, 14.vi.1935 (*J. E. & R. B. Benson*) (BMNH); 4 ♀, same data except height and date 5–7000 ft, 21–27.vi.1935 (BMNH); 4 ♀, same data as the holotype except date 6–27.vi.1935 (BMNH); 1 ♀, Arolla, 6500 ft 12.vi.1935 (*J. E. & R. B. Benson*) (BMNH); 1 ♂, 1 ♀, same data except date 18.vi.1935 (BMNH); 2 ♀, same data except date 29.vi.1935 (BMNH).

The holotype is in good condition.

Dolerus anticus subsp. ***seljuki*** Benson, 1968*a* : 137. Holotype ♀, TURKEY: Gumsane, Bayburt, 1600 m, 26.v.1962 (*Guichard & Harvey*) (BMNH, No. 1.810).

Paratypes. TURKEY: 1 ♀, N.W., Edirne, 6.v.1960 (*Guichard & Harvey*) (BMNH); 1 ♀, Samsun, Lake Ladig, 800 m, 26.vii.1959 (*Guichard*) (BMNH); 1 ♂, N.E., Erzurum, Ovacik, 2000 m, 30.vi.1962 (*Guichard & Harvey*) (BMNH); 1 ♀, Gumsane, Bayburt, 1600 m, 26.v.1962 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Dolerus docilus Benson, 1956*b* : 60, 61. Holotype ♂, ITALY: Lombardia, Mercallo, 3.iv.1955 (BMNH, No. 1.681).

Paratypes. ITALY: 1 ♂, same date as the holotype (BMNH); 3 ♂, 5 ♀, Lago del Segrino, 15.iv.1955 (MCSNGD, Genoa); 6 ♂, 1 ♀, Lombardia, Lago di Pusiano, Erba, 25.iv.1955 (*L. Cerasa*) (BMNH); 4 ♂, Lombardia, 25.iv.1955 (*L. Cerasa*) [publ. as 8 ♂, 3 ♀, 15.iv.1955] (BMNH).

The holotype is in good condition; the genitalia are mounted separately and on a card attached to the same pin as the holotype.

Dolerus frigidus Benson, 1965*a* : 114. Holotype ♂, SWITZERLAND: Valais, Col de Bretolet s/Champéry (Val d'Illiez), 1923 m, 16–31.v.1964 (*J. Aubert*) (MZ, Lausanne).

Paratypes. SWITZERLAND: 5 ♂, same data as the holotype (BMNH) (MZ, Lausanne); 1 ♂, Bettmeralp, 1800–2100 m, 5–16.vi.1959 (*J. E. & R. B. Benson*) (BMNH).

The holotype is in good condition.

Dolerus harwoodi Benson, 1947*a* : 62. Holotype ♂, GREAT BRITAIN: Scotland, Aviemore 6.iv.1944 (*P. Harwood*) (BMNH, No. 1.680).

Paratypes. GREAT BRITAIN: 1 ♂, same data as the holotype except date 23.iii.1944 (BMNH); 11 ♂, 1 ♀, same data as the holotype except date 5.iv.1946 (BMNH). SWEDEN: 2 ♂, Skåne, Dalby, 6.v.1938 (*D.M.S. & J. F. Perkins*).

The holotype has the apical segment of the left antenna missing and four apical segments of the right antenna missing.

Dolerus humeralis Benson, 1967*b* : 171. Holotype ♀, AFGHANISTAN: Prov. Herat, Bala Murghab, 470 m, 23. iii [publ as 20. iii]–1.iv.1964 (*O. Jakès*) (MM, Brno, No. 344).

The holotype is in good condition.

Dolerus hyrcanus Benson, 1968*a* : 140,141. Holotype ♂, IRAN: Mazandaran, Chalus-Chahsavar coast, 23.iii.1966 (*D. B. Baker*) (BMNH, No. 1.812).

Paratypes. 19 ♂, 3 ♀, same data as the holotype except date 25.ii.–28.iii.1966 (BMNH).

The holotype is good condition.

Dolerus montivagus Benson, 1968*a* : 138. Holotype ♀, TURKEY: Trabzon, Songali Gecidi, 2600 m, 26.v.1962 (*Guichard & Harvey*) (BMNH, No. 1.811).

Paratypes. TURKEY: 3 ♂, same data as the holotype (BMNH); 13 ♂, Trabzon, Zigana Gecedi, 1650 m, 22.v.1962 (*Guichard & Harvey*) (BMNH); 1 ♂, 1 ♀, Trabzon, Hamsikoy, 1245 m, 23–24.v.1962 (*Guichard & Harvey*) (BMNH); 1 ♂, 1 ♀, Rize, Sivrikaya, 1700 m, 3.vi.1962 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Dolerus nivalis Benson, 1963*b* : 270. Holotype ♀, SWITZERLAND: Valais, Saas-Fee, 7000–8000 ft, 25.vi.1962 (*R. B. Benson*) (BMNH, No. 1.792).

Paratypes. SWITZERLAND: 1 ♂, same data as the holotype except date 21.vi.1962 (BMNH); 1 ♀, Ferpècle, 1500–2000 m, 21–27.vi.1935 (*R. B. Benson*) (BMNH).

The holotype is in good condition.

Dolerus romanus Benson, 1954*d* : 276. Holotype ♂, ITALY: Ermikia, Rivola, Fuenza, 18.ii.1951 (*P. Zangheri*) (MCSN, Verona, but cited as in Zangheri Coll).

The holotype is in good condition; it was later presented to the Museo Civico di Storia Naturale, Verona, Italy. It is labelled with a red-edged circular label with the word 'Type' in Benson's handwriting, 'det. Benson 26.i.53 ♂' in Zangheri's handwriting, 'Romagna, Rivola, 18/ii/1951, coll. Zangheri.'

The holotype is in good condition.

Dolerus willoughbyi Benson, 1956*b* : 55. Holotype ♀, SWEDEN: Torne Lapmark, Abisko, 9–19.vii.1954 (*J. E. & R. B. Benson*) (BMNH, N.1.679).

Paratypes. SWEDEN: 1 ♀, same data as the holotype (BMNH); 4 ♂, 1 ♀, same data as the holotype except the date 11–16.vi.1954 (BMNH); 16 ♂, 3 ♀, same data as the holotype except the date 17–22.vi.1954 (BMNH); 2 ♂, 9 ♀, same data as the holotype except the date 25–30.vi.1954 (BMNH); 3 ♀, same data as the holotype except the date 1–5.vii.1954 (BMNH); 1 ♀, Abisko, Mt Nuoja, 2000–3000 ft, 8.vii.1954 (BMNH); 1 ♂, Bjorkliden, 8–9.vii.1954 (BMNH); 3 ♀, Riksgränsen, 11–12.vii.1951 (BMNH). NORWAY: 1 ♀, Mainland, East of Tromso Hill, 9.vi.1921 (*C. S. Elton*) (BMNH). FINLAND: 2 ♂, 2 ♀, Inl. Utsjoki, Outakosti, 24–25.vi.1925; 1 ♀, Enl. Kilpisjarvi, 7.vii.1950; 2 ♂, same data except the date 8–9.vii.1954 (*E. Lindqvist*); 1 ♀, Psl. Petsamo, Lullojoki (*Plantonoff*) (Lindqvist Coll.).

The holotype is in good condition.

Elinora dulcis Benson, 1968*a* : 181,184. Holotype ♀, MOROCCO: Grand Atlas, Idni, 8.v.1941 (*K. M. Guichard*) (BMNH, No. 1. 805).

The holotype has the antennae, right hind tarsi and left foreleg missing.

Elinora guichardi Benson, 1954*d* : 287. Holotype ♀, LIBYA: Tripolitania, 75 km south of Bou Ngem, 4.ii.1952 (*K. M. Guichard*) (BMNH, No. 1.720).

Paratypes. LIBYA: 1 ♀, same data as the holotype (BMNH); 1 ♂ (with simple mid tibial spurs), same data as the holotype (BMNH); 5 ♂, Tripolitania, Wadi Ghodaifa, 3.iii.1952 (*K. M. G.*); 1 ♂, Wadi Tonzist, 51 miles south of Bou Ngem, 8.111.1952 (K. M. Guichard Coll.).

The holotype is in good condition.

Elinora saharensis Benson, 1954*d* : 286. Holotype ♀, ALGERIA: Sahara Desert, Ahaggar Mountains, Oued Tamanrusset, 10° E., 24° N., at about 1300 m, 5.iii.1928 (cited as in MNHN, Paris).

The holotype has not been located in the Muséum National d'Histoire Naturelle, Paris. No specimens of this species are in the BMNH collection.

Elinora stolida Benson, 1968*a* : 181, 185. Holotype ♂ ISRAEL: Jerusalem, 15.iii.1923 (*P. A. Buxton*) (BMNH, No. 1.806).

The holotype has only two segments remaining of the right antenna. A further det. label is attached to the holotype 'Allantus sp. (cf. syriacus Andre.) N.B. black on costa and stigma.'

Emphytus basalis subsp. **caledonicus** Benson, 1945*g* : 103. Holotype ♂, GREAT BRITAIN: Scotland, Grantown [publ. as Inverness, Abernethy], 14.vii.1944 (*P. Harwood*) (BMNH, No. 1.763).

Paratypes. GREAT BRITAIN: 1 ♀, same data as the holotype except date 30.vi.1944 (*P. Harwood*) (BMNH); 1 ♀, Scotland, Nethy Bridge, 8.vii.1914 (*J. J. F. X. King*) (BMNH); 1 ♀, Scotland, Spey Side, 17.vii.1922 (*J. J. F. X. King*) (BMNH).

The holotype has only five segments remaining of the left hand antenna. The genitalia are mounted on a separate card attached to the pin.

Empria alector Benson, 1938*c* : 191. Holotype ♀, GREAT BRITAIN: Scotland, Moray, Grantown, 8.vi.1934 (*R. B. Benson*) (BMNH, No. 1.651).

Paratypes. GREAT BRITAIN: 3 ♀, same data as the holotype (BMNH); 2 ♀, Scotland, Inverness, Aviemore, 2–4.vi.1934 (*R. B. Benson*) (BMNH); 3 ♀, England, Hertfordshire, Gade Valley, 27.v.1933; 1 ♀, England, Boxmoor, 28.v.1933 (*R. B. Benson*); 1 ♀, England, Buckinghamshire, Halton, Dancers End, 29.v.1930 (*R. B. Benson*) (BMNH); 1 ♂, England, Devonshire, Newton Abbot, 1 ♀ 25.v.1931 (*R. C. L. Perkins*) (BMNH); 1 ♂, 1 ♀, England, Bovey Tracey, 1928 (*J. F. Perkins*) (BMNH); 1 ♀, England, Bovey Tracey, 17.v.1927 (*R. C. L. Perkins*) (BMNH); 1 ♀, England, Lancashire, Yealand Redmayne, 13.vi.1932 (*H. W. Miles*) (BMNH). IRELAND: 1 ♀, North Tipperary, Nenagh, 18.v.1927 (*A. R. A. Phillips*) (BMNH); 1 ♂, Kilkenny, 1.v.1906 (*A. W. Stelfox*) (BMNH); 1 ♀, Leix, Tankardstown, 31.v.1931 (*A. W. Stelfox*) (BMNH); 2 ♂, 1 ♀, Kildare, north of Sallins, 5.v.1935 (*A. W. Stelfox*) (BMNH); 3 ♂, 2 ♀, Westmeath, Newtownlow (*A. W. Stelfox*) (BMNH). SWITZERLAND: 1 ♂, Jurra (*E. Enslin*) (Perkins Coll.).

The holotype has eight segments of the left and two of the right antenna missing. The R. C. L. Perkins collection is now in the University Museum, Oxford.

Empria alpina Benson, 1938*c* : 190. Holotype ♀, GREAT BRITAIN: Scotland, Perthshire, Breadalbane Mountains, Crags above Lochan à Lairige on the catkins of *Salix recticulata* L., vi. 1932 (*R. B. Benson*) (BMNH No. 1.650).

Paratypes. GREAT BRITAIN: 1 ♂ (allotype), 1 ♀, same data as the holotype (BMNH). SWITZERLAND: 1 ♀, Valais, Arolla, 8–9000 ft, on catkins of *Salix retusa* L., and *herbacea* L., 1.vii.1935 (*R. B. Benson*) (BMNH); 1 ♂, Les Haudères, Alp du Zaté, 6–8000 ft, 10–12.vi.1935 (*R. B. Benson*) (BMNH).

The holotype is in good condition and the genitalia are mounted on a slide.

Empria persephone Benson, 1954*b* : 279. Holotype ♂, FRANCE: Var, Les Arcs [publ. Les Argos], 15.iv.1939 (*W. Fassnidge*) (BMNH, No. 1.711).

The holotype is in good condition and the genitalia are mounted on a slide, 28.iii.49, R.B.B.

Eopsis beaumonti Benson, 1959*g* : 122. Holotype ♀, SWITZERLAND: Vaud, Les Pléiades, c. 1200 m, 25.v.1955 (*J. de Beaumont*) (MZ, Lausanne).

Paratypes. 1 ♂, same data as the holotype except date 29.v.1958 (BMNH); 1♂, same data except date and collector, 3.vi.1959 (*R. B. Benson*) (BMNH).

The holotype is in good condition.

Eriocampa ovata subsp. ***nitens*** Benson, 1968*a* : 154. Holotype ♀, TURKEY: Rize, Cayeli, 15 m, 22.viii.1959 (*Giuchard*) (BMNH, No. 1.814).

Paratypes. TURKEY: 19 ♀, same data as the holotype (BMNH); 1 ♀, Rize, 21.viii.1959 (BMNH); 1 ♀, Trabzen at sea level, 24.viii.1959 (*Guichard*) (BMNH).

The holotype is in good condition.

Eriotremex malayanus Benson, 1943*c* : 43,44. Holotype ♂, MALAYA: (*H. M. Pendlebury*) (BMNH, No. 1.40).

The holotype has the left antenna missing except for segments one and two. The holotype was described by Forsius (1934), unfortunately he omitted to add the generic name. The holotype described by Benson bears the following labels in Benson's hand writing '*Eriotremex malayanus* det. R. B. Benson, 1942, ♂.' A further label is attached in Forsius' handwriting '*Tremex malayana* n. sp. Holotypus R. Forsius det.'

Eurys aglaia Benson, 1963*a* : 82. Holotype ♀, AUSTRALIA: Western Australia, Yanchep, 5.ix.1962 (*A. Douglas*) (WAM, Perth, No. 64–6).

Paratypes. 2 ♀, same data as the holotype (WAM, Perth); 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition; it is listed on p. 40 of the Western Australian Museum's Report for 1963–64.

Eurys calliphenges Benson, 1938*g* : 360. Holotype ♀, AUSTRALIA: Queensland, Stradbroke Island (*H. Hacker*) (QM, Brisbane, No. T.5951).

Paratypes. AUSTRALIA: 1 ♀, same data as the holotype (BMNH); 1 ♀, New South Wales, Pt Stephens, Nelson's Bay, 30.viii.1920 (BMNH); 2 ♀, same data except date 31.viii.1920 (AM, Sydney, No. K43273); 1 ♂, same data except date 29.viii.1920 (bearing a paratype label and an identification label by Benson with 'Allotype *Eurys calliphenges* ♂ det. R. B. Benson 1938' (AM, Sydney, No. K43272).

Eurys chloe Benson, 1938*g* : 359. Holotype♂, AUSTRALIA: Mt Kosciusko, 5000 ft, 10.xii.1931 (*L. F. Graham*) (ANIC, Canberra).

Paratype. 1 ♀, same data as the holotype (BMNH). This specimen is damaged.

The holotype is in good condition.

Eurys pulcher Benson, 1934*i* : 467. Holotype ♀, AUSTRALIA: New South Wales, near Mittagong, 12.viii.1930 (*L. F. Graham*) (ANIC, Canberra).

The holotype is in good condition.

Eutomostethus gagthinus subsp. ***meridionalis*** Benson, 1954*d* : 282. Holotype ♀, CYPRUS: Chifflicondia, near Limassol, 20.iii.1946 (*G. A. Mavromoustakis*) (BMNH, No. 1.714).

Paratypes. 2 ♂, 2 ♀, same data as the holotype (BMNH); 3 ♂, 4 ♀, same data except date 13.iii.1946; 3 ♂, 5 ♀, same data except date 21.iii.1946; 2 ♂, same data except date 28.iii.1946; 2 ♀, same data except date 31.iii.1946 (BMNH).

The holotype is in good condition.

Fenella famosa Benson, 1950*a* : 55. Holotype ♀, SWITZERLAND: Valais, Les Haudères, 4000–5000 ft, 6–27.vi.1935 (*J. E. & R. Benson*) (BMNH, No. 1.707).

The holotype is in good condition.

Fenella granulata Benson, 1953*e* : 136, 138. Holotype ♀, ALGERIA: Phillippeville, 1903 (*A. Thery*) (cited as in the MNHN, Paris).

The holotype cannot be found in the Muséum National d'Histoire Naturelle, Paris. This species is not represented in the BMNH collection.

Gilpinia pindrowi Benson, 1961*a* : 309. Holotype ♀, PAKISTAN: Punjab, Muree, 33·54° N., 73·80° E., 3000–6000 ft, ex cocoon on *Abies pindrow*, 5.viii.58 (BMNH No. 1.786).

The holotype has the right antenna missing. The genitalia are mounted on a slide 26.xi.52/1.

Guiglia aureola Benson, 1955*a* : 21, 22. Holotype ♀, AUSTRALIA: New South Wales (ex T. Shiraki coll.) [cited as in the Taiwan Agric. Res. Inst.].

Paratypes. 1 ♂, 1 ♀, same data as the holotype (Taiwan Agric. Res. Inst.).

Benson gives the following synonomy '(=*serricata* (Mocsāry) Maa, 1950 nec Mocsāry, 1900)'. The type of *Guiglia serricata* Mocsāry, 1900, is housed in the TM, Budapest. No confirmation as to the whereabouts of Maa's specimens on which Benson based his description has been received.

Guiglia bombycinis Benson, 1938*d* : 13. Holotype ♀, AUSTRALIA: N. Queensland, Kuranda, 1000 ft, 4–29.vii.1913 (*R. E. Turner*) (BMNH, No. 1.3).

Paratypes. Publ. as 7 ♂, 8 ♀, same data as the holotype (BMNH); 1 ♂, same data as the holotype (NMV, Melbourne, No. T.4369); 1 ♀, same data as the holotype (QM, Brisbane, No. T.5930).

The holotype has the left fore leg missing.

Guiglia chiliensis Benson, 1955*c* : 112. Holotype ♀, CHILE: Canelo, Santiago, xii. 1952 (*T. Ramiriz*) (cited as in the Buenos Aires Mus.).

Paratype. 1 ♂, same data as the holotype (M. A. Fritz coll.).

I have been unable to locate the whereabouts of the holotype or the paratype.

Guiglia coracina Benson, 1955*a* : 21, 22. Holotype ♀, AUSTRALIA: North Queensland, Melanda, 5.xi.1950 (*W. L. Brown*) (cited as in the MCZ, Harvard).

Since publication Harvard University have transferred all Australian insect types to ANIC, Canberra. While in the Harvard University collection the holotype had the number 29403 attached to it.

Haplocephus aureus Benson, 1935*f* : 551. Holotype ♂, ALGERIA: South Oran, Ain Sefra, 18.v.1913 (*W. Rothschild & E. Hartert*) (BMNH, No. 1.16).

The holotype has both antennae missing; parts of the holotype are mounted on a slide.

Heliorussus scutator Benson, 1955*a* : 18. Holotype ♂, SIERRA LEONE: Movahba, 16.ii.1925 (*E. Hargreaves*) (BMNH, No. 1.659).

The holotype has both antennae and the right fore leg missing.

Heliorussus spinifer Benson, 1955*a* : 18. Holotype ♀, RHODESIA: Melsetter, 18.x.1950 (*Dr G. Arnold*) (NMR, Bulawayo).

The holotype is in good condition.

Hemidianeura flavicornis Benson, 1930*a* : 107.

Replacement name for *Hemidianeura apicalis* Enderlien, 1919, junior primary homonym of *Hemidianeura apicalis* Moscary, 1909.

Heteroperreyia nigerrima Benson & Conde, 1938*f* : 123, 154. Holotype ♂, BRAZIL: Espirito Santo, St Theresa, 2.xii.1928 (*O. Conde*) (DEI, Eberswalde).

The holotype is in good condition.

Heteroperreyia pseudoleprieuri Benson & Conde, 1938*f* : 123, 154. Holotype ♀, BRAZIL: Espirito Santo bei Sta. Thereza, 18.xi.1928 (DEI, Eberswalde).

The holotype is in good condition.

Hoplocampa* (*Hoplocampa*) *ariae Benson, 1933*c* : 255. Holotype ♀, GREAT BRITAIN: England, Surrey, Box Hill, 24.v.1926 (*W. E. China*) (BMNH, No. 1.602).

Paratypes. GREAT BRITAIN: 1 ♂ (allotype), 4 ♀, England, Surrey, Guildford, 1.vi.1918 (*G. C. Champion*) (BMNH); 1 ♀, England, Surrey, North Downs near Aldbury, 2.vi.1921 (*F. D. Morice*) (UM, Oxford); 1 ♀, England, Oxford, Headington, Bayswater Mill, 29.v.1925, (A. H. Hamm Coll.); 1 ♂ (*Dr Capron*) (UM, Oxford).

The holotype is in good condition.

Hoplocampa prunicola Benson, 1968*a* : 201. Holotype ♀, TURKEY: Izmit, Karamursel, 23.iii.1961 on *Prunus* (*H. Birkadester*) (BMNH, No. 1.825).

The holotype is in good condition. The genitalia are mounted on a slide No. 26.vii.61/3.

Janus malaisei Benson, 1946*c* : 99. Holotype ♀, BURMA: north-east, Kambaiti, 7000 ft, 16.v.1934 (*R. Malaise*) (NR, Stockholm).

The holotype is in good condition.

Kaliofenusa ulmi subsp. ***laevinota*** Benson, 1968*a* : 150. Holotype ♀, TURKEY: Mugla, Ula (Mezarlik), 700 m, on *Ulmus*, 17.iv.1962 (*Guichard & Harvey*) (BMNH, No. 1.827).

Paratypes. TURKEY: 8 ♂, 1 ♀, same data as the holotype (BMNH); 1 ♀ Bursa, Bursa-Mundacanya Rd, 50 m, 28.iv.1962 (*Guichard & Harvey*) (BMNH); 1 ♀, Corum, Iskilip, 700 m, 9.v.1962 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Kokujewia palestina Benson, 1954*d* : 271. Holotype ♀, ISRAEL: Wadi Umbaghik, larva on ? *Rumex*, emerged iii. 1945 (*H. Bytinsky-Salz*) (BMNH, No. 1.672).

The holotype is in good condition.

Leptorussus africanus Benson, 1955*d* : 19. Holotype ♀, RHODESIA: Bulawayo, 29.iv.1927 (*R. H. R. Stevenson*) (NMR, Bulawayo),

The holotype is in good condition.

Lophyrotoma cibdeliformis Benson, 1958*b* : 15. Holotype ♀, NEW GUINEA: Wisselmeren, Paniai, 1750 m, ix.–xi. 1939 (*H. Boschma*) (RNH, Leiden).

Paratypes. 1 ♂, 1 ♀, same data as the holotype (RNH, Leiden); 2 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Macrophya aphrodite Benson, 1954*d* : 289. Holotype ♀, CYPRUS: Episcopi, 28.iv.1937 [publ. 14–30.v.1937] (*G. A. Mavromoustakis*) (BMNH, No. 1.749).

Paratypes. CYPRUS: 6 ♂, 8 ♀, same data as the holotype (BMNH); 1 ♂, Platus, 19.vi.1937 (G. A. M. Coll.); 1 ♀, Platus, 3800 ft, 10.viii.1937 (G. A. M. Coll.).

The holotype is in good condition.

Macrophya cyrus Benson, 1954*d* : 290. Holotype ♀, IRAN [cited S. W. Persia]: K. Sefid, (BMNH, No. 1.750).

Paratypes. IRAN: 10 ♂, 5 ♀, same data as the holotype (BMNH); 2 ♂, 2 ♀, Bazuft (Escalera coll.) (BMNH).

The holotype is in good condition.

Macrophya diaphenia Benson, 1968*a* : 191, 195. Holotype ♂, IRAN [cited S. W. Iran): Kuh Sefid, nr Bazuft (Escalera coll.) (BMNH, No. 1.823).

Paratypes. IRAN: 3 ♂, 2 ♀, same data as the holotype (BMNH); 1 ♀, Elburz Mountains, Mt Demavend, 2180 m, vii. 1966 (*L. Higgins*) (BMNH).

The holotype is in good condition.

Macrophya hamata Benson, 1968*a* : 190, 194. Holotype ♂, TURKEY: Artvin, above Artvin, 1800 m, 6.vi.1962 (*K. M. Guichard & D. Harvey*) (BMNH, No. 1.822).

Paratypes. TURKEY: 1 ♂, same data as the holotype except height 900 m; 1 ♂, Trabzon, Hamsikoy, 1245 m, 22.v.1962 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Macrophya minerva Benson, 1968*a* : 196, 197. Holotype ♀, GREECE: Soufli, 5.v.1960 (*Guichard & Harvey*) (BMNH, No. 1.824).

The holotype is in good condition.

Macrophya oedipus Benson, 1968*a* : 190, 194. Holotype ♂, TURKEY: Amasya, 500 m, 31.v.1959 (*K. M. Guichard*) (BMNH, No. 1.821).

Paratypes. 5 ♂, 1 ♀, same data as the holotype except date, 22–24.v.1959; 2 ♂, 2 ♀, same data as the holotype except date, 29.v.1959; 4 ♂, same data as the holotype except date, 1–2.vi.1959; 1 ♀, same data as the holotype except date, 9.vi.1959; 6 ♂, 4 ♀, same data as the holotype except date 30.v.1959 (BMNH).

The holotype is in good condition.

Megadineura himalayana Benson, 1963*f* : 20. Holotype ♀, KASHMIR: 6000–7000 ft (*C. G. Nurse*) (BMNH, No. 1.790 [publ. No. 1.787]).

The holotype is in poor condition; the head, right fore leg and left fore tibia are missing.

Mesoneura lanigera Benson, 1954*d* : 292. Holotype ♀, CYPRUS: Pera Pedi, 2000 ft, 4.iv.1952 (*G. A. Mavromoustakis*) (BMNH, No. 1.684).

Paratypes. CYPRUS: 2 ♀, same data as the holotype (BMNH); 1 ♂, Potamitissa, 3000 ft, 25–26.iii.1944 (*G. A. M.*) (BMNH).

The holotype is in good condition.

Metapedius pyensoni Benson, 1940*a* : 465. Holotype ♀, BRAZIL: Pernambuco, 1937 (*Pyenson*) (BMNH, No. 1.639).

Paratypes. 5 ♀, same data as the holotype (BMNH).

The holotype has the right antenna, fore legs and left mid leg missing.

Mocsarya syriaca Benson, 1936*a* : 2. Holotype ♀, SYRIA: Akbès (*O. Abt*) (NM, Vienna).

The holotype has the right hind leg and anterior tarsi missing. The head and left fore wing are mounted on a card.

Monophadnus alpicola Benson, 1954*d* : 281. Holotype ♀, SWITZERLAND: Valais, Arolla, 7000 ft, 18.vi.1935 (*J. E. & R. B. Benson*) (BMNH, No. 1.713).

Paratypes. SWITZERLAND: 1 ♀, same data as the holotype (BMNH); 14 ♀, same data as the holotype except date, 29.vi.1935 (BMNH); 2 ♀, Les Haudères, 4–5000 ft, 6–27.vi.1935 (*J. E. & R. B. Benson*) (BMNH).

The holotype is in good condition.

Monophadnus furvus Benson, 1930*a* : 107.

Replacement name for *Monophadnus bipunctatus* MacGillivray, 1908, junior primary homonym of *Monophadnus bipunctatus* Klug, 1866.

Monophadnus vapularis Benson, 1930*a* : 107.

Replacement name for *Monophadnus planus* MacGillivray, 1921, junior secondary homonym of *Monophadnus planus* (Klug, 1818).

Neateuchopus tigris, Benson, 1935*f* : 550. Holotype ♀, U.S.S.R.: Astrachan, Kyn-Peski (Coll. Konow) (DEI, Eberswalde).

The holotype is in good condition.

Nematinus willigkiae subsp. ***pilosus*** Benson, 1958*d* : 194. Holotype ♀, GREAT BRITAIN: Scotland, Aviemore, 1.vi.1944 (*P. Harwood*) (BMNH, No. 1.764).

Paratypes. GREAT BRITAIN: 1 ♀, Scotland, Aviemore, 11.vii.1903 (*J. J. F. X. King*) (BMNH); 1 ♀, Scotland, Bonar Bridge (*Cameron*) (BMNH); 1 ♂, Scotland, Aviemore, 29.vi.1944 (*P. Harwood*) (BMNH).

The holotype is in good condition. The paratypes listed above, although in the BMNH collection, were not referred to by Benson.

Nematus* (*Pontania*) *coriaceus Benson, 1953*d* : 150. Holotype ♀, GREAT BRITAIN: England, Bucks, Whaddon Chase, 22.vii.1944 (*R. B. Benson*) (BMNH, No. 1.689).

Paratypes. GREAT BRITAIN: 1 ♂, 1 ♀, Scotland, Moray, Grantown, 3.vi.1934 (*J. E. & R. B. Benson*) (BMNH); 3 ♂, Scotland, Perthshire, nr Killin, 14.vi.1933 (*R. B. Benson*) (BMNH); 1 ♀, Scotland, Rannoch, 5–10.vi.1931 (*R. B. Benson*) (BMNH). SWEDEN: 1 ♂, 7 ♀, Skåne, Höör district, 1–5.vi.1938 (*D. M. S. & J. F. Perkins*) (BMNH); 1 ♀, Elsov, 24.v.1938 (*D. M. S. & J. F. Perkins*) (BMNH); 1 ♀, Dagstorp, Sjö, 28.v.1938 (*D. M. S. & J. F. Perkins*) (BMNH); 1 ♀, same data except date 3.vii.1938 (BMNH).

The holotype is in good condition.

Nematus olfaciens Benson, 1953*a* : 61. Holotype ♀, GREAT BRITAIN: Scotland, Angus, Dundee, emerged vii–viii. 1952 from larvae on *Ribes nigrim* L. (*Ann Sanderson*) (BMNH, No. 1.696).

Paratypes. GREAT BRITAIN: 6 ♂, 15 ♀, same data as the holotype (BMNH); 3 ♂, 5 ♀, England, Gloucestershire, emerged vii. 1952 from larvae on *Ribes nigrum* L. (*R. C. Twyman*) (BMNH)

The holotype is in good condition.

Nematus* (*Pachynematus*) *omega Benson, 1955*d* : 103. Holotype ♂, SWITZERLAND: Valais, Ferpècle, 2100 m (*J. E. & R. B. Benson*) (BMNH, No. 1.701).

Paratype. 1 ♂, same data as the holotype (BMNH).

The holotype is in good condition and the genitalia are mounted on a slide No. 2.iv.1951–1.

Nematus polygoni Benson, 1961*f* : 228. Holotype ♀, GERMANY: Bavaria, Zweisel, reared from larvae feeding on *Polygonum bistorta* L., 22.vii.1956 (*R. Hinz*) (BMNH, No. 1.793).

Paratypes. 2 ♂, 1 ♀, same data as the holotype (BMNH).

The holotype has the right antenna missing.

Nematus proteus Benson, 1963*f* : 26, 27. Holotype ♀, BURMA: north-east, Kambaiti, 7000 ft, 18.iv.1934 (*R. Malaise*) (NR, Stockholm).

Paratypes. Published as 8 ♀, same data as the holotype except date 23.iii.–21.iv.1934; 1 ♂, same date as the holotype except date 17.v.1934, 1 ♂, 5 ♀, NR, Stockholm; 3 ♀, (BMNH). In the BMNH collection are 4 ♀, with the dates 27.iii.1934, 12.iv.1934, 5.iv.1934; in the Stockholm Museum are 6 paratypes (sexes not confirmed).

Nematus (Pontania) tuberculatus Benson, 1953*d* : 151. Holotype ♀, IRELAND: Co. Cavan, Lough Mentis, 18.v.1941 (*R. C. Faris*) (BMNH, No. 1.690).

Paratypes. IRELAND: 1 ♂, Farrinseer, 21.v.1941 (*R. C. Faris*) (BMNH). GREAT BRITAIN: 1 ♀, Scotland, Forres, Culbin Sands, 21.v.1952 (*R. B. Benson*) (BMNH).

The holotype is in good condition. In the BMNH collection is 1 ♀, labelled paratype, with the following data: Wales, Presteigne, 8–9.v.1953 (*R. B. Benson*). This specimen does not have a determination label.

Neoeurys aurora Benson, 1935*e* : 220. Holotype ♀, AUSTRALIA: Queensland, Stanthorpe, 12.viii.1925 (QM, Brisbane, No. T.5949).

Paratype. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Neoeurys brevivalvis Benson, 1935*e* : 220. Holotype ♀, AUSTRALIA: Queensland, Sunnybank, Brisbane, 8.ix.1915 (*H. Hacker*) (QM, Brisbane, No. T.5950).

Paratype. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Neoeurys erecta Benson, 1938*h* : 365. Holotype ♀, AUSTRALIA: Dagarra, from flowers of *Acacia* sp., 23.viii–5.ix.1935 (*R. E. Turner*) (BMNH, No. 1.478).

Paratypes. 3 ♀, same data as the holotype (BMNH); 4 ♂, same data as the holotype except date 18–22.viii.1935 (BMNH).

The holotype is in good condition.

Neoeurys evansi Benson, 1938*g* : 362. Holotype ♀, AUSTRALIA: Tasmania, National Park, 3500 ft, xii. 1936, beaten from *Nothofagus cunninghami* Hook (*J. W. Evans*) (BMNH, No. 1.479).

The holotype is in good condition; its genitalia are mounted on a slide.

Neoeurys fusca Benson, 1934*i* : 477. Holotype ♀, AUSTRALIA: New South Wales, Botany Bay (*H. Peterson*) (cited as USNM, Washington).

The holotype has not been located.

Neoeurys leptocoleum Benson, 1938*g* : 361. Holotype ♀, AUSTRALIA: Tasmania, Mount Wellington, 18.xi.1917 ((*C. E. Cole*) (SAM, Adelaide).

Paratype. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition. No type number has been assigned to it.

Neoeurys nigra Benson, 1934*i* : 476. Holotype ♀, AUSTRALIA: New South Wales, Mount Kokiusko, Diggers Ct, 5000 ft, 10.xii.1931 (*L. F. Graham*) (ANIC, Canberra).

Paratypes. AUSTRALIA: 4 ♀, same data as the holotype (BMNH); 2 ♀, same data as the holotype (ANIC, Canberra); 1 ♀, Thredbor, 3000 ft, 15.xii.1931 (*L. F. Graham*) (ANIC, Canberra); 1 ♀, Federal Capital Territory, Blundells, 21.i.1931 (*L. F. Graham*) (ANIC, Canberra).

The holotype is in fair condition.

Neoeurys trochilus Benson, 1938*g* : 364. Holotype ♀, AUSTRALIA: Dongarra, 13–22 [publ. 18–22] viii. 1935 (*R. E. Turner*) (from flowers of *Acacia* sp.) (BMNH, No. 1.480).

Paratypes. 24 ♀, same data as the holotype (BMNH); other paratypes located as follows; 1 ♀, (QM, Brisbane, T.7123); 1 ♀, (AM, Sydney, K69322); 1 ♀, (NMV, Victoria, T.4387).

The holotype is in good condition.

Neoeurys turneri Benson, 1938*g* : 365. Holotype ♀, AUSTRALIA: Western Australia, Dongarra, from flowers of *Acacia* sp. 6–19.ix.1935 (*R. E. Turner*) (BMNH, No.1.481).

Paratypes. 5 ♂, 5 ♀, same data as the holotype except date 13–22.viii.1935; 2 ♂, same data except date 23.viii.1935; 3 ♂, 5 ♀, same data except date 6–19.ix.1935. 2 ♀, same data except date 20–25.ix.1935. 19 paratypes are in the BMNH; 1 ♀ in AM, Sydney (K.69321); 1 ♀ in NMV, Victoria (T.4388); 1 ♀ in SAM, Adelaide; 1 ♀ in QM, Brisbane (T.7122).

The holotype is in good condition.

Neostomboceros rufa Benson, 1935*c* : 173. Holotype ♂, JAVA: west, Tapos, Mount Gedeh, 700 m, vii. 1933 (*J. Van der Vecht*) (RNH, Leiden).

Paratype. 1 ♂, same data as the holotype (BMNH).

The holotype is in good condition.

Neosyrista japonica Benson, 1935*f* : 552. Holotype ♀, JAPAN: Kofou, 1906 (*L. Drouart de Lezey*) (MNHN, Paris).

Paratype. ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Nepionema helvetica Benson, 1960*c* : 174. Holotype ♀, SWITZERLAND: Valais, Aletschwald, 6000–7000 ft, 7–17.vi.1959 (*J. E. & R. B. Benson*) (BMNH, No. 1.768).

Paratypes. SWITZERLAND: 14 ♂, 6 ♀, same data as the holotype (BMNH); 1 ♂, Bettmeralp, 6000–7000 ft, 7–17.vi.1959 (*J. E. & R. B. Benson*) (BMNH); 2 ♂, 2 ♀, near Verbier, c. 7500 ft, 20–28.vi.1959 (*J. E. & R. B. Benson*) (BMNH); 2 ♂, 5 ♀, same data except height and date 8000–8500 ft, 27.vi.1959 (BMNH).

The holotype is in good condition.

Orussobaius mesembrinus Benson, 1938*d* : 9. Holotype ♀, AUSTRALIA: New South Wales, Bogan River, taken on a dead branch of *Acacia pendula* A. Cunn., x. 1932 (*J. Armstrong*) (NMV, Melbourne, T.1510).

Paratypes. AUSTRALIA: 1 ♂ (allotype), same data as the holotype (NMV, Melbourne, T.1511); 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition. The above specimens were in the F. E. Wilson collection until his death in 1960 when they were donated to the National Museum of Victoria.

Orussobaius minutus Benson, 1938*d* : 10. Holotype ♀, AUSTRALIA: New South Wales, Bogan River (*J. Armstrong*) (NMV, Melbourne, T.1508).

Paratypes. 1 ♂, same data as the holotype (NMV, Melbourne, T.1509), 1 ♂ (allotype), same data as the holotype (BMNH).

The holotype is in good condition. The above specimens were in the F. E. Wilson collection until his death in 1960 when they were donated to the National Museum of Victoria.

Orussobaius wilsoni Benson, 1938*d* : 10. Holotype ♀, AUSTRALIA: Victoria, Ferntree Gulley, 8.iii.1931 (*F. E. Wilson*) (NMV, Melbourne, No. T.1507).

The holotype is in good condition. The above specimen was in the F. E. Wilson collection until his death in 1960 when it was donated to the National Museum of Victoria.

Pachynematus calcicola Benson, 1948*c* : 63. Holotype ♂, GREAT BRITAIN: England, Yorks, Pen-y-ghent, top of Moughton, v. 1933 (*F. W. Edwards & W. H. T. Tams*) (BMNH, No. 1.698).

Paratypes. GREAT BRITAIN: 2 ♂, same data as the holotype except Moughton, Juniper Valley (BMNH); 1 ♂, England, Herts, Aldbury Owers, 21.iv.1946 (*R. B. Benson*) (BMNH); 1 ♂, England, Beds, Pegsdon Hills, Shillington 6.v.1936 (*V. H. Chambers*) (BMNH); 1 ♂, Valais, Arolla, 8000–8500 ft, 30.vi.1935 (*R. B. Benson*) (BMNH).

The holotype is in good condition.

Pachynematus chambersi Benson, 1948*c* : 63. Holotype ♂, GREAT BRITAIN: England, Beds, Ampthill, 17.v.1947 (*V. H. Chambers*) (BMNH, No. 1.699).

The holotype is in good condition.

Pachynematus lacteipennis Benson, 1963*e* : 162. Holotype ♀, AUSTRIA: Semmeringebiet, Razalp, c. 6000 ft, on *Rumex* sp., 3.vi.1957 (*R. B. Benson*) (BMNH, No. 1.789).

Paratypes. SWITZERLAND: 60 ♂, 29 ♀, same data as the holotype (BMNH); 7 ♂, 6 ♀, Valais, Bettmeralp, 6000–7000 ft, 5–16.vi.1959 (*R. B. Benson*) (BMNH); 1 ♀, Valais, Aletschwald, 6000–7000 ft, 7–17.vi.1959 (*R. B. Benson*) (BMNH); 67 ♂, 45 ♀, Valais, Saas-Fee, 5500–6000 ft, 19–22.vi.1962 (*R. B. Benson*) (BMNH).

The holotype is in good condition.

Pachynematus styx Benson, 1958*c* : 301. Holotype ♀, GERMANY: South Lower Saxony, Sieber, Harz, c. 600 m, reared 1955 from larvae collected vii. 1954 on *Picea abies* (*Thalenhorst*) (BMNH) No. 1.791).

Paratypes. 3 ♂, same data as the holotype except date collected vii. 1951, reared 1952 (*W. Thalenhorst*) (BMNH).

The holotype has both antennae missing. The genitalia are mounted on a slide, 4.xi.55/2.

Pachynematus sulcatus Benson, 1948*c* : 63. Holotype ♂, GREAT BRITAIN: Scotland, Perthshire, Killin, 31.vi.1932 (*R. B. Benson*) (BMNH, No. 1.700).

The holotype is in good condition; its genitalia are mounted on a slide.

Pachynematus truncatus Benson, 1948*c* : 63. Holotype ♂, GREAT BRITAIN: England, Bucks, Slapton, 26.v.1943 (*R. B. Benson*) (BMNH, No. 1.702).

Paratypes. GREAT BRITAIN: 1 ♂, Scotland, Lanark, Possil Marsh (*P. Cameron*) (BMNH); 1 ♂, Scotland, Inverness, Aviemore, 1–5.vi.1934 (*R. B. Benson*) (BMNH); 1 ♂, same data except date 28.vii.1934 (BMNH); 1 ♂, Scotland, Loch Eilen, 9.vii.1934 (BMNH); 1 ♂, Scotland, Angus, Glen Clova, 1000 ft, 11–30.vi.1939 (BMNH); 1 ♂, same data as the holotype (BMNH); 1 ♂ (Stephens Coll.) (BMNH); 1 ♂, England, Surrey, Richmond Park, 22.v.1926 (BMNH); 1 ♂, same data except date 26.v.1926 (*J. Waterston*) (BMNH); 1 ♂, England, Middlesex, Uxbridge, 21.v.1926 (*J. Waterston*) (BMNH); 1 ♂, England, Herts, West Turville, 7.vii.1924 (*R. B. Benson*) (BMNH); 1 ♂, England, Boxmoor, 12.v.1934 (*R. B. Benson*) (BMNH); 2 ♂, England, Cambs, Wicken Fen, v. 1929 (*R. B. Benson*) (BMNH); 2 ♂, England, Lancs., Milton, 14.v.1924; 2 ♂, same data except date 18.v.1924 (*R. B. Benson*) (BMNH); 1 ♂, England, Manchester, Gorton, 7.ix.1946 (*H. Britten*) (BMNH); 1 ♂, Westmorland, Langdale, vi. 1929 (*K. G. Blair*) (BMNH); 1 ♂, England, Upper Teesdale, 1000–1200 ft, 13.v–7.vi.1939 (*R. B. Benson*) (BMNH). IRELAND: 1 ♂, Co. Wicklow, Athdown, 23.vi.1937 (*A. W. Stelfox*) (BMNH); 1 ♂, Cavan, Drumora, 28.iv.1940 (*R. C. Faris*) (BMNH). CZECHOSLOVAKIA: 1 ♂, Bohemia, Chodau, 5.vi.1877, and 1 ♂, 5.v.1914, R. von Stein Coll. (BMNH); 1 ♂, 'Gastein', 2.vii.1900 (*R. von Stein*) (BMNH).

The holotype is in good condition.

Pamphilius hortorum subsp. ***bicinctus*** Benson, 1945*d* : 104. Holotype ♀, GREAT BRITAIN: Scotland, Perthshire, Rannoch, 11–13.vi.1931 (*R. B. Benson*) (BMNH, No. 1.83).

Paratypes. GREAT BRITAIN: 1 ♀, same data as the holotype except date 15–21.vi.1932 (BMNH); 1 ♀, Scotland, Killin, 15–21.vi.1932 (*R. B. Benson*) (BMNH); 1 ♀, Scotland, Comrie, 25.vi.1900 (BMNH); 1 ♀, Scotland, Aberdeen, Braemar, vi. 1910 (*H. Donisthorpe*) (Morice Coll.) (not located); 1 ♀, Scotland, Inverness, Aviemore, 1.vii.1944 (*P. Harwood*) (BMNH).

The holotype is in good condition. Benson did not label the holotype or paratypes; this has now been done.

Pedicrista hyalina Benson, 1935*a* : 7, 8. Holotype ♀, RHODESIA: Doddieburn Ranch, Umzingwane R., 16.viii.1934 (*G. Arnold*) (BMNH, No. 1.1).

Paratypes. RHODESIA: 1 ♂ (allotype), same data as the holotype (BMNH). MALAWI: 1 ♀, Nyasaland, Mlanje, 4.v.13, 2–3000 ft (*S. A. Neave*) (BMNH).

The holotype has the mid and hind legs badly damaged. Both paratypes are also badly damaged.

Perga bradleyi Benson, 1939*g* : 338, 339. Holotype ♀, AUSTRALIA: New South Wales, Blue Mountains (*A. Musgrove*) labelled '*Perga dahlbomii* Westwood, ♀' id., by R. J. Tillyard (AM, Sydney, No. K40046).

The holotype is in good condition; it was mistakenly listed as being in the BMNH collection and given the No. 1.515.

Perga konowi Benson, 1939*g* : 336, 338. Holotype ♀, AUSTRALIA: New South Wales, Euston, 'Mallee scrub', bred from larvae on *Eucalyptus transcontinentalis* Maiden, in 1933 (BMNH, No. 1.514).

Paratypes. AUSTRALIA: 1 ♂ (allotype), same data as the holotype (BMNH); 2 ♀, same data as the holotype except collector (*W. W. Froggatt*) (AM, Sydney); 1 ♀, Western Australia, Narrogin (WAM, Perth, 1934–1226); 1 ♀, Western Australia, Raeburn (WAM, Perth, 1922–680).

The holotype is in good condition.

Perga leaski Benson, 1959*a* : 288. Holotype ♀, AUSTRALIA: Victoria, Clunes, bred from larvae 20.ii.1958 (larva no. 500) (*M. F. Leask*) (BMNH, No. 1.798).

The holotype is in good condition.

Perga thomsoni Benson, 1935*e* : 226. Holotype ♀, AUSTRALIA: Toowoomba [publ. Tooloom], 12.ii.1922 (*H. Hacker*) (QM, Brisbane, No. T5942).

Benson states that the abdomen of the holotype is badly eaten by *Anthrenus* and that the saw is missing. This is confirmed by Dr E. C. Dahms (QM, Brisbane).

Pergagrapta condei Benson, 1939*g* : 341, 344. Holotype ♀, AUSTRALIA: South Australia, Adelaide, 'collected for me by a schoolboy' (*R. C. L. Perkins*) (BMNH, No. 1.523).

The holotype is in good condition.

Pergagrapta malaisei Benson, 1939*g* : 342, 346. Holotype ♀, AUSTRALIA: Victoria, Windsor, 21.xii.1909 (*G. F. Hill*) (NMV, Melbourne, No. T4376).

The holotype is in good condition.

Pergagrapta nigra Benson, 1939*g* : 342, 347. Holotype ♀, AUSTRALIA: New South Wales (*R. E. Turner*) labelled '*Perga bella nigra*, type Rohwer' MSS label (BMNH, No. 1.532).

The holotype is in good condition. The det. label reads '*Perga nigra* sp. n. det. R. B. Benson 1935.'

Pergagrapta rohweri Benson, 1939*g* : 343, 348. Holotype ♀, AUSTRALIA: South Adelaide (BMNH, No. 1.533).

Paratype. 1 ♀, same data as the holotype (NMV, Melbourne, No. T4373).

The holotype has both antennae and tarsal segments of the left hind leg missing.

Pergagrapta rossi Benson, 1939*g* : 343, 348. Holotype ♀, AUSTRALIA: Victoria, Windsor, xii. 1909 (*B. F. Hill*) (NMV, Melbourne, No. T.4375).

The holotype is in good condition.

Pergagrapta turneri Benson, 1939*g* : 341, 345. Holotype ♀, AUSTRALIA: Queensland, Mackay (*G. Turner*) (BMNH, No. 1.528).

Paratypes. 1 ♂ (allotype), Cairns (*R. E. Turner*); 1 ♀, Mackay, '163' '♀' 'Ridges Mackay' 'R. E. Turner Coll. 1917–136'; 1 ♀, 'Queensland, Mackay, R. E. Turner 1915–86', 'Mackay, 2·92', '*Perga polita* Leach'; 1 ♀, 'Mackay 11·92', '163', 'R. E. Turner Coll. 1917–136'. (Publ. as 1 ♀, ii. 1892, 2 ♀, xi. 1892 (*R. E. Turner*); 1 ♂ (allotype), Cairns (*R. E. Turner*) (BMNH).]

The holotype is in good condition. The right hind tibia and tarsus are mounted on a card separately from the specimen. Both fore legs are missing.

Pergagrapta hackeri Benson, 1939*g* : 342, 346. Holotype ♀, AUSTRALIA: Victoria, Melbourne (BMNH, No. 1.529).

Paratypes. AUSTRALIA: 1 ♀, ix. 1901 (*R. E. Turner*) (BMNH); 1 ♀, (BMNH); 1 ♂ (allotype), (BMNH); 1 ♂, 1 ♀, AUSTRALIA: near Melbourne; 1 ♀, Noble Park (*C. Oke*); 1 ♂, publ. as Nairnsdale, correctly labelled Bairnsdale, G. Easton, iii. 1925 (*Dr Sweet*); 1 ♀, without data (NMV, Melbourne, Nos, T4370, T.4371, T.4374).

The holotype has the left fore leg, right fore leg and hind claws missing.

Perreyiella pseudonigra Benson & Conde 1938*f* : 123, 132. Holotype ♂, PERU: Callanga, Cuzco Coll. Konow (DEI, Eberswalde).

The holotype has a red rectangular label with the word 'Typus' printed on it together with a determination label '*Perreyiella pseudonigra* O. Conde. det. 1936, Typus'. The holotype has the fore legs and three segments of the abdomen missing.

Phylacteophaga eucalypti subsp. ***occidens*** Benson, 1963*a* : 84. Holotype ♀, AUSTRALIA: Western Australia, Nollamara, emerged 20.ix.1962, ex mines in leaves of *Eucalyptus marginata* Sm. collected ix. 1962 (*A. M. Douglas*) (WAM, Perth, No. 64–8).

Paratypes. AUSTRALIA: 5 ♂, 8 ♀, same data as the holotype (2 ♂, 2 ♀, BMNH; remainder WAM, Perth); 6 ♀, Western Australia, Tuart Hills, em., 5–17.ix.1962 (WAM, Perth).

The holotype is in good condition. It has been listed on p. 40 of the Western Australian Museum's Annual Report for 1963–64.

Platypsectra nigripes Benson, 1938*b* : 620, 621. Holotype ♀, AUSTRALIA: Victoria, Studley Park (NMV, Melbourne, T.4384).

The holotype is in good condition; its genitalia are mounted on a slide. The slide dissection of the holotype was listed in the BMNH collection under the No. 1.799; this has been returned to the National Museum of Victoria.

Platypsectra ramosa Benson, 1938*b* : 622. Holotype ♀, AUSTRALIA: Victoria, Melbourne (*F. du Boulay*) (BMNH, No. 1.454).

Paratypes. AUSTRALIA: 1 ♀, Victoria, Melbourne, Sunshine, 22.iii.1919 (*C. E. Cole*) (BMNH); 1 ♀, Victoria, Melbourne, Windsor (*B. F. Hill*) (NMV, Melbourne, No. T.4385).

The holotype is in good condition.

Pleuroneura numidica Benson, 1940*c* : 39. Holotype ♀, ALGERIA: northern slope of Mt Babor (Kabylie Range), 1900 m, 16–20.vi.1939 (*P. de Peyerimhoff*) (MNHN, Paris).

Paratypes. 1 ♂ (allotype), 2 ♀, same data as the holotype (MNHN, Paris); 2 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Pontania algida Benson, 1941*d* : 134, 135. Holotype ♀, GREAT BRITAIN: Scotland, Perthshire, Breadalbane Mountains, near Killin, over 2000 ft, collected from *Salix herbacea* L., 7–14.vi.1932 (*R. B. Benson*) (BMNH, No. 1.693).

Paratypes. 3 ♀, same data as the holotype (BMNH).

The holotype is in poor condition; only two segments of the right antenna and four segments of the left antenna remain. The right fore and hind legs are missing.

Pontania aquilonis Benson, 1941*d* : 134. Holotype ♀, SWEDEN: Torne Träske (*Malaise*) (BMNH, No. 1.692).

The holotype has both antennae missing and the fore tarsi have been glued to the pin on which the specimen is mounted. Two determination labels are attached to the holotype: '*Pontania herbaceae* Cam. det. Malaise' and '*Pontania aquilonis* Benson. ♀. Holotype 1941.' Benson in error published *aquilonis* as nom. n. (= *herbaceae* (Cameron) sensu Malaise).

Pontania arbusculae Benson, 1941*d* : 133, 134. Holotype ♀, GREAT BRITAIN: Scotland, Perthshire, Crags above Lochan à Lairige near Killin, c. 2000 ft, bred v. 1933, from galls collected from *Salix arbuscula* L. (Floderus det.), viii. 1932 (*G. Taylor*) (BMNH, No. 1.691).

Paratypes. 1 ♂ (allotype), same data as the holotype (BMNH); 1 ♂, 1 ♀, same data as the holotype (BMNH); 1 ♀, no data except collected from catkins of *Salix arbuscula* L., viii. 1932 (BMNH).

The holotype is in poor condition; the right antenna is missing and the right mid and both hind tarsi are missing.

Pontania arctophilae Benson, 1960*a* : 327, 373. Holotype ♀, CANADA: Manitoba, Churchill, 8.vii.1956, ovipositing on *Salix arctophila* Cockerell (*R. B. Benson*) (CNC, Ottawa, No. 7221).

Paratypes. 35 ♀, same data as the holotype except date, 25.vi–8.vii.1956 (BMNH); 1 ♀, same data (CNC, Ottawa).

The holotype is in good condition.

Pontania beckettae Benson, 1960*a* : 378. Holotype ♀, CANADA: Manitoba, Churchill, ex galls on *Salix planifolia* Pursh, coll. ix. 1957 (*Eva Beckett*) (CNC, Ottawa, No. 7222).

Paratypes. 40 ♀, 13 ♂, same data as the holotype; 29 ♀ same data except ex galls on *S. discolor* Muhl; 1 ♀ same data except ex gall on *Salix glauca* L.,; 25 ♀, 3 ♂, same data except ex galls on *Salix reticulata* (CNC, Ottawa) (BMNH); 11 ♀, 1 ♂, same data as holotype except 24.vi–4.vii.1956 (*R. B. Benson*) (BMNH).

The holotype is in good condition.

Pontania caranifrons Benson, 1940*g* : 210. Holotype ♀, GREAT BRITAIN: Scotland, Roxburghshire, Newcastleton, collected from *Salix pentandra* L., on the bank of the River Liddel, 23.vi.1940 (*R. B. Benson*) (BMNH, No. 1.636).

The holotype is in good condition.

Pontania glabrifrons Benson, 1960*a* : 375, 376. Holotype ♀, SWEDEN: Torne Träsk district, reared from galls on *Salix lanata* L., gathered in ix. 1948 (*J. E. & R. B. Benson*) (BMNH, No. 1.788).

Paratypes. SWEDEN: 13 ♂, 6 ♀, same data as the holotype (BMNH and NR, Stockholm); 9 ♂, 41 ♀, Abisko, on *Salix lanata* 11–16.vi.1954 (*J. E. & R. B. Benson*) (BMNH); 3 ♂ 13 ♀, same data except date, 17–22.vi.1954 (BMNH), 1 ♂, 4 ♀, same data except date, 25–30.vi.1954 (BMNH); 6 ♀, Björkliden, 24.vi.1954 (*J. E. & R. B. Benson*) (BMNH); 1 ♂, 2 ♀, same data except date, 3.vii.1954 (BMNH): 1 ♀, same data except date, 8–9.vii.1954 (BMNH); 3 ♀, Riksgränzen, 2–12.vii.1954 (*J. E. & R. B. Benson*) 3 ♀, Tornham, 4.vii.1954 (*J. E. & R. B. Benson*) (BMNH); 1 ♀, Salkvaara, 1–11.vii.1955 (*J. P. S. Pringle*) (BMNH).

The left foreleg of the holotype is missing.

Pontania harrisoni Benson, 1940*e* : 91. Holotype ♀, GREAT BRITAIN, Scotland, Roxburghshire, Newcastleton, viii.1937 (*R. B. Benson*) (BMNH, No. 1.635).

Paratypes. GREAT BRITAIN: 11 ♂, 14 ♀, same data as the holotype (BMNH); 1 ♀, England, N. Yorkshire, Middleton-in-Teesdale, bred iv.v.1938 from galls on *Salix purpurea* L. and its hybrids collected in viii.1937 (*R. B. Benson*) (BMNH). CZECHOSLOVAKIA: Bohemia, 75 ♀, Chodau (R.v. Stein Coll.) (BMNH).

The holotype is in good condition.

Pontania myrtillifoliae Benson, 1960*a* : 372. Holotype ♀, CANADA: Manitoba, Churchill, 24–26.vi.1956, on *Salix myrtifolia* Anderss. (*R. B. Benson*) (CNC, Ottawa, No. 7220).

Paratypes. 5 ♀, same data as the holotype; 2 ♀, same data except date 3–4.vii.1956 (1 ♀ CNC, Ottawa, remainder BMNH).

The holotype is in good condition.

Pontania retusae Benson, 1960*c* : 180. Holotype ♀, SWITZERLAND: Valais, Mt Rogneux, Lac Vaux near Verbier c. 9000 ft, at catkins of *Salix retusa* L., 27.vi.1959 (*J. E. & R. B. Benson*) (BMNH, No. 1.766).

Paratype. 1 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Pontania robbinsi Benson, 1935*b* : 26. LECTOTYPE ♀, by present designation, GREAT BRITAIN: England, Yorkshire, R. Tyne, Riding Mill, v.1932 (*J. Wilkinson*), ex galls on *Salix phylicifolia andersoniana* Smith, em. v.–vi.1933 (BMNH, No. 1.831).

Paralectotypes. 2 ♂, 7 ♀, same data as the lectotype (BMNH).

The lectotype and paralectotypes all bear labels as indicated by Benson in his original description of the species. Benson did not select or label a holotype or paratypes. No Cameron type-material that can be associated with Benson's references in the original description has been found. Benson in error referred to *Pontania robbinsi* as nom. n.

The lectotype is in good condition.

Pontania triandrae Benson, 1941*d* : 131. Holotype ♀, GREAT BRITAIN: England, N. Somerset, Bristol, 1st brood 1937 (bred by *Dr Mary Carlton*) (BMNH, No. 1.695).

Paratypes. 94 ♀, same data as the holotype (BMNH).

The holotype has only two segments remaining of the right antenna.

Priophorus laevifrons Benson, 1936*b* : 205. Holotype ♀, GREAT BRITAIN: England, Hertfordshire, Gaddesden, 11.v.1926 (*R. B. Benson*) (BMNH, No. 1.603).

Paratypes. GREAT BRITAIN: 1 ♂ (allotype), England, Devonshire, Newton Abbot, 11.v.1925 (*R. C. L. Perkins*) (BMNH); 1 ♀, same data except date, bred from larva collected ix.1924, emerged 14.v.1925 (BMNH); 1 ♀, England, Suffolk, Framlingham, v–vii.1927 (*R. B. Benson*) (BMNH); 1 ♀, Cambridgeshire, Milton, 3.v.1924 (*R. B. Benson*) (BMNH); 1 ♂, 8.v.1921 (UM, Oxford).

The holotype has the right antenna missing.

Pristiphora asperlatus Benson, 1935*b* : 36. Holotype ♀, GREAT BRITAIN: Inverness-shire, Mount Braeriach, 4000 ft, 25.vi.1934 (*J. E. & R. B. Benson*) (BMNH, No. 1.643).

Paratypes. GREAT BRITAIN: 5 ♂ (including allotype), 2 ♀, same data as the holotype (BMNH); 5 ♀, Scotland, Cairn Gorm, 4000 ft, 27.vi.1934 (*J. E. & R. B. Benson*) (BMNH); 3 ♀, same data except date, 29.vi.1934 (BMNH); 1 ♂, Scotland, Cairn Lochain, 3–4000 ft, 3.vii.1934 (*J. E. & R. B. Benson*) (BMNH); 3 ♂, 2 ♀, Scotland, Perthshire, Bein Chuallaich, 2–3000 ft, 12–13.vi.1931, (BMNH); 1 ♀, same data except date 17.vi.1931 (BMNH); 1 ♂, Scotland, Rannoch, 1–4.vi.1931 (BMNH); 9 ♂, 10 ♀, Scotland, Breadalbane Mountains, above 2500 ft, 31.v–6.vi.1932 (BMNH); 4 ♀, same data except date 7–14.vi.1932 (BMNH); 1 ♂, Scotland, Killin, 31.v.–14.vi.1932 (BMNH); 1 ♀, Scotland, Beamore, above 2500 ft, 4.vi.1932 (BMNH); 2 ♂, 3 ♀, Scotland, Meall nà Samhne, above 2500 ft, 6.vi.1932 (BMNH). SWEDEN: 1 ♂, 4 ♀, North Lapland, Vassijaure; 1 ♀, Kalixfors; 2 ♂, 2 ♀, Torne Träske (*R. Malaise*) (BMNH). U.S.S.R.: 1 ♂, 1 ♀, East Siberia, Kamchatka Peninsula (BMNH).

The holotype is in good condition except for the right antenna, which has only six segments remaining.

Pristiphora chalybeata Benson, 1963*f* : 23, 25. Holotype ♀, BURMA: north-east, Kambaiti, 7000 ft, 23.iv.1934 (*R. Malaise*) (NR, Stockholm).

Paratype. 1 ♂, same data as the holotype except date 15.iv.1934 (BMNH).

The holotype has labels 'dissection on slide. Series 28.x.58/8' and 'R.M.prep.3881'. The head of the holotype is glued to the 'type' label on the pin.

Pristiphora fuscata Benson, 1943*i* : 181.

Replacement name for *Nematus fumipennis* Thomson, 1871, junior primary homonym of *Nematus fumipennis* Stephens, 1835.

Pristiphora glauca Benson, 1954*g* : 113. Holotype ♀, GREAT BRITAIN: England, Hereford, Mortimer Forest, 16.iv.1953, from 'blue green' larvae collected on *Larix decidua* Mill. and *Larix leptolepis* Sieb. & Zucc., v–viii.1952 (*R. C. Kirkland et al.*) (BMNH, No. 1.703).

Paratypes. GREAT BRITAIN: 28 ♂, 17 ♀, same data as the holotype except bred 25.iii–22.iv.1953 (BMNH); 1 ♀, England, Bucks, Denham, 17.v.1937 (*K. Clarke*) (BMNH). SWITZERLAND: 1 ♀, Valais, Les Haudères 4000–5000 ft, 6–27.vi.1935 (*J. E. & R. B. Benson*) (BMNH).

The holotype is in good condition.

Pristiphora rufocincta Benson, 1963*f* : 22. Holotype ♀, BURMA: north-east, Kambaiti, 7000 ft, 26.iii.1934 (*R. Malaise*) (NR, Stockholm).

The holotype is in good condition. It has labels 'Dissection on a slide, Series No. 28.x.58/3' and 'R.M. prep. 3882' attached to the pin.

Pteronidea fuscarima Benson, 1933*d* : 258. Holotype ♀, IRELAND: Wicklow, Devil's Glen, larva x.1927, bred v.1928 (*A. W. Stelfox*) (BMNH, No. 1.632).

Paratypes. IRELAND: 3 ♀, same data as the holotype (BMNH); 1 ♂ (allotype), same data except date 4.v.1928 (BMNH); 4 ♂, 14 ♀, larvae bred v.1928, 3 ♂, 14.v.1928, 2 ♀, larvae vi.1928, bred vii.1928, 2 ♂, 2 ♀ (R. C. L. Perkins collection) (UM, Oxford); 2 ♂, 2 ♀, Wicklow, Powerscourt (R. C. L. Perkins collection) (UM, Oxford). The larvae in the field and on *Salix* were collected by *A. W. Stelfox*, *A. S. Linsey*, and *A. M. Gwynn;* they were sent to R. C. L. Perkins, who reared them. GREAT BRITAIN: 1 ♀, Scotland, Lanark, Cadder, 3 ♀ (P. Cameron collection) (BMNH).

The holotype has only six segments of the right antenna remaining, and the left hind tarsus is missing.

Pteronidea nubium Benson, 1935*b* : 30. Holotype ♀, GREAT BRITAIN: Scotland, Breadalbane Mountains, above 2000 ft, 7–14.vi.1932 (*R. B. Benson*) (BMNH, No. 1.637).

Paratypes. GREAT BRITAIN: 2 ♀, Scotland, Perthshire, Meall nà Samhne, above 2500 ft, 16.iv.1932 (*R. B. Benson*) (BMNH); 1 ♂ (allotype), Scotland, Inverness-shire, Mount Braeriach, 4000 ft (*R. B. Benson*) (BMNH); 1 ♀, same data except date 25.vi.1934 (BMNH).

The abdomen of the holotype is missing.

The paratypes cannot be located.

Pteronidea leionata Benson, 1933*d* : 259. Holotype ♀, GREAT BRITAIN: England, Devon, Great Haldons 18.iv.1926 (*R. C. L. Perkins*) (BMNH, No. 1.634).

Paratypes. 2 ♀, same data as the holotype (BMNH); 1 ♀, same data except bred from larva on *Betula*, 6.vii.1926 [publ. 6.vii.1924] (*R. C. L. Perkins*) (UM, Oxford).

The holotype is in good condition.

Pterygophorus facielonga Benson, 1938*b* : 616. Holotype ♀, AUSTRALIA: New South Wales, Woodford, 27.i.1913 (*G. A. Waterhouse*) (BMNH, No. 1.456).

Paratypes. AUSTRALIA: 1 ♀, New South Wales, Cumberland (*R. E. Turner*) (BMNH); 2 ♀, New South Wales, Sydney (*C. Gibbons*) (BMNH); 1 ♀, New South Wales, Sydney, Maronbra, 29.ix.1912, 'on flowers of Eucalyptus' (*A. Musgrave*) (BMNH); New South Wales, Hunter River (*Macgillivray*) (BMNH); 1 ♂, Queensland, Narrabim (*A. Burns*) (BMNH); 1 ♀, Queensland; Burpengary (*T. Bancroft*) (BMNH); 1 ♀, Victoria, 29.xii.1917 (*B. F. Hill*) (BMNH); 1 ♀, no other data (BMNH); 1 ♂ (allotype), New South Wales, La Peroux, 12.x.1921 (NMV, Melbourne No. T.4379); 1 ♀, Victoria, Lilyvale (NMV, Melbourne No. T.4380); 1 ♀, Victoria, Windsor, 29.xii.1917 (*B. F. Hill*) (NMV, Melbourne No. T.4381). 1 ♀, without data (NMV, Melbourne No. T.4382).

Pteryperga galla Benson, 1938*b* : 623. Holotype ♀, AUSTRALIA: New South Wales, Tweed River, bred from cocoons (*W. W. F. & H. Brooks* [publ. *H. Brooke*]) (ANIC, Canberra).

Paratypes. AUSTRALIA: 1 ♀, same data as the holotype (BMNH); 2 ♀, same data as holotype (AM, Sydney, K48017). 1 ♀, same data (BMNH); 3 ♀, Dorrigo (*W. Heron*) (SAM, Adelaide).

The holotype is in good condition. It is labelled '*Platysectroides galla*, det. R. B. Benson 1936'. Benson had obviously changed his mind at a later date prior to publication but omitted to change the det. label on the holotype.

Rhipidoctenus cinderellae Benson, 1954*i* : 117, 118. Holotype ♂, MOROCCO: Oudjda (*Dr Sicart*) (cited as in ZM, Strasbourg).

The holotype has not been located.

Rhogogaster bactriana Benson, 1965*e* : 110, 111. Holotype ♂, AFGHANISTAN: east, Paghman-Geb., 200 m, 14.vi.1953 (*J. Klapperich*) (TM, Budapest).

Paratype. ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Rhogogaster chambersi (and nominate subspecies) Benson, 1947*c* : 97. Holotype ♀, GREAT BRITAIN: England, W. Sussex, Chichester, 1919 (*P. Harwood*) (BMNH, No. 1.723).

Paratypes of nominate subspecies. GREAT BRITAIN: 1 ♀, same data as the holotype (BMNH); 1 ♀, England, S. Devon, 4.vi.1929 (*R. C. L. Perkins*) (BMNH); 1 ♀, England, Nunton, nr Salisbury (*T. A. Marshall*); 2 ♀, England, Surrey, Boxhill, 6.vi.1926 (*P. Harwood*) (BMNH); 1 ♂, England, Surrey, E. Sheen, 18–25.v.1930 (*A. M. Low*) (BMNH); 1 ♀, England, Surrey, Chobham, 20.v.1897 (*F. D. Morice*) (UM, Oxford); 4 ♀, England, ?Shere (*Capron*, in Morice Collection) (UM, Oxford); 4 ♀, England, Surrey, Woking, 5.vi.1920 (*H. D.*) (UM, Oxford); 2 ♀ (G. C. Champion Coll.) (UM, Oxford); 1 ♀, England, Middlesex, vii. 1907 (*P. Harwood*) (BMNH); 1 ♀, England, Bucks, Farnham Common, 17.v.1934 (*J. F. Perkins*) (BMNH); 1 ♀, England, Cheshire, Halton, 28.v.1928 (*R. B. Benson*); 1 ♀, England, Essex, Colchester, 1909 (*P. Harwood*) (BMNH); 1 ♀, England, Bedfordshire, Clophill, 16.vii.1946 (*V. H. Chambers*) (BMNH); 3 ♂, 3 ♀, England, Cambridgeshire, Odell, White Lane, around *Rosa* 29.v.1937 (*V. H. Chambers*); 1 ♂, England, Bedfordshire, Whipsnade, Deadmansea Wood, on *Betula* 19.vi.1946 (*V. H. Chambers*); 3 ♀, Scotland, Dumfries, Thornhill (P. Cameron Coll.) (BMNH); Scotland, Stirling, Touch Hills (P. Cameron Collection); 1 ♀, Scotland, Inverness, Nethy Bridge, 7.vi.1934 (*J. E. & R. B. Benson*) (BMNH); 1 ♂, Scotland, Findhorn River, 5.vi.1934 (*W. H. T. Tams*) (BMNH); 1 ♀, Scotland, Sutherland, Bonar Bridge (P. Cameron Collection); 1 ♂, 5 ♀ (J. F. Stephens Coll.) (BMNH).

The holotype is in good condition.

Rhogogaster chambersi subsp. ***genistae*** Benson, 1947*c* : 98. Holotype ♀, CZECHOSLOVAKIA: Chodau 'bred from a batch of larvae feeding on *Genista germanica* L., *G. tinctoria* L. and *Cytisus nigricans* L., see Stein, 1929, p. 129'; (*R. von Stein*) (BMNH, No. 1.724).

Paratypes. CZECHOSLOVAKIA: 1 ♂, 3 ♀, same data as the holotype (BMNH); 1 ♀, Carlsbad, v–vi.1900 (C. G. Nurse Coll.) (BMNH). AUSTRIA: 1 ♀, Tyrol, Nanders, 13–18.vii.1938 (*J. V. Glynn, T. H. Rowsell & B. J. Clifton*) (BMNH). GERMANY: 2 ♂, 1 ♀, Buchecker Coll. (BMNH); 1 ♂, 1 ♀ (Ruthe Coll.) (BMNH). SWITZERLAND: 4 ♂, 7 ♀, Valais, Les Haudères, 4–5000 ft, 6–7.vi.1935 (*J. E. & R. B. Benson*) (BMNH); 1 ♂, Arolla, 6000 ft, 6.viii.1935 (*J. E. & R. B. Benson*) (BMNH). FRANCE: 1 ♀, Pyrenees, Ariège, Ax-les-Thermes, vii. 1912 (*C. Ferrière*) (BMNH); 1 ♂, Haute-Loire, Monistrol, v.1903 (*F. D. Morice*) (UM, Oxford); 2 ♂, Aude, Narbonne, iv. 1903 (*F. D. M.*) (UM, Oxford); 1 ♀, Var, Les Arcs, 28.iv.1939 (*W. Fassnidge*) (BMNH).

The holotype has the right antenna missing.

Rhogogaster naias Benson, 1965*e* : 110, 112. Holotype ♂, TURKEY: Pr. Gumusane near Maden, 1800 m, by sweeping *Salix* by swift flowing stream in gorge, 29.v.1962 (*K. M. Guichard & D. Harvey*) (BMNH, No. 1.802).

Paratypes. 10 ♂, 12 ♀, same data as the holotype (BMNH).

The holotype is in good condition.

Rhysacephala wilsoni Benson, 1954*h* : 159. Holotype ♀, AUSTRALIA: Victoria, Ringwood, 19.xi.1939 (*F. E. Wilson*) (NMV, Melbourne, T.1506).

The holotype is in good condition.

The F. E. Wilson collection was donated after his death in 1960 to the National Museum of Victoria.

Selandria serva subsp. ***fuscitarsis*** Benson, 1954*d* : 276. Holotype ♂, GREECE: Corfu, 8.iv.1912 (*F. D. Morice*) (BMNH, No. 1.678).

Paratypes. ITALY: 2 ♂, 1 ♀, Romagne, 1945 (*P. Zangheri*) (BMNH); 1 ♂, 1 ♀, same data (Zangheri Coll., not confirmed); 1 ♀, Bologna, Gaibola, 24.iv.1950 (*G. Grandi*) (BMNH); 1 ♀, same data except date 30.iv.1951 (*G. Grandi*) (G. Grandi Coll. not confirmed).

The holotype is in good condition. The Grandi Collection has not been located.

Seljukia tenebrosa Benson, 1966*e* : 76. Holotype ♀, TURKEY: Mersin, Gosne, 600 m, 4.vi.1960 (*K. M. Guichard & D. Harvey*) (BMNH, No. 1.826).

Paratypes. 11 ♂, 5 ♀, same data as the holotype except date 3–5.vi.1960 (BMNH).

The holotype is in good condition.

Sciapteryx byzantina Benson, 1968*a* : 187, 188. Holotype ♀, TURKEY: Istanbul, Belgrat Orman, at sea level, 25.iii.1962 (*Guichard & Harvey*) (BMNH).

Paratypes. TURKEY: 15 ♂, 1 ♀, same data as the holotype (BMNH); 1 ♀, Rize, at sea level, 22.iv.1959 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Sciapteryx cleopatra Benson, 1954*d* : 284. Holotype ♀, ISRAEL: Jerusalem, 1929 (*S. Tahudhi*) '*Sciapteryx costalis* F., ♂ det. R. Forsius' (BMNH, No. 1.719).

Paratype. EGYPT: 1 ♀, Alexandria, 1902 (*J. de Joannis*) (MNHN, Paris).

The holotype is in good condition.

Sciapteryx costalis subsp. ***corcyrensis*** Benson, 1954*d* : 283. Holotype ♀, GREECE: Corfu (S. S. Saunders Coll.) (BMNH, No. 1.718).

The holotype has the right antenna missing, the left antenna is broken and mounted separately. The holotype has an additional label 'Corfu. 743.'

Scolioneura hyrcana Benson, 1968*a* : 149, 150. Holotype ♂, IRAN: Mazandaran, Shalus-Shahsavar coast, 18.iv.1966 (*D. Baker*) (BMNH No. 1.813).

The holotype has the left antenna missing.

Sirex cyaneus subsp. ***melanopoda*** Benson, 1965*b* : 141. Holotype ♀, KASHMIR: ex logs of *Abies pindrew* Spach., vi. 1963 (BMNH, No. 1.804).

Paratypes. KASHMIR: 1 ♂, 1 ♀, same data as the holotype (CIBC, India). INDIA: 1 ♂, 1 ♀, Punjab, Koti-Kula, ex logs of *Abies pindrow*, vi. 1963 (CIBC, India not confirmed).

The holotype has the right fore tibia and tarsus missing.

Stromboceros subtilis Benson, 1935*c* : 175. Holotype ♂, JAVA: west, Tjibodas, Mount Gedeh, 1400–1700 m, 28.vi.1932 (*H. R. A. Muller*) (RNH, Leiden).

The holotype is in good condition and the genitalia are mounted separately on a slide.

Strongylogaster lineata subsp. ***cypria*** Benson, 1954*d* : 276. Holotype ♀, CYPRUS: near Platania Forest Station, 3500–4000 ft, 7.v.1945 (*G. Mavromoustakis*) (BMNH, No. 1.677).

Paratypes. CYPRUS: 1 ♀, same data as the holotype (BMNH); 1 ♀, Mt Troodos, 5500–6000 ft, 28.vi.1937 (*G. A. M.*) (BMNH).

The holotype is in good condition.

Styracotechys dicelysma Benson, 1935*e* : 225. Holotype ♀, AUSTRALIA: New South Wales, Tooloom, 1926 (*H. Hacker*) (QM, Brisbane, T.5952).

The holotype is in good condition and the genitalia are mounted on a slide.

Tenthredella viridans Benson, 1930*a* : 107.

Replacement name for *Tenthredella enslini* Forsius, 1918, junior primary homonym of *Tenthredella enslini* Schirmer, 1913.

Tenthredo acerrima Benson, 1952*b* : 128. Holotype ♀, GREAT BRITAIN: England, Herts, Tring, 25.vii.1940 (*R. B. Benson*) (BMNH, No. 1.737).

Paratypes. 4 ♂, 70 ♀, from GREAT BRITAIN, Cornwall to Caithness, to Outer Hebrides, and IRELAND to Aran Islands, vi–ix. (BMNH). 2 ♂, 70 ♀, from FRANCE, GERMANY, SWITZERLAND, AUSTRIA and YUGOSLAVIA (Benson, loc. cit.).

The holotype has the fore tarsi and right mid tibia and tarsus missing.

Tenthredo afra Benson, 1930*a* : 107.

Replacement name for *Tenthredo diversipes* Pic, 1925, junior primary homonym of *Tenthredo diversipes* Schrank, 1782.

Tenthredo beaumonti Benson, 1950*a* : 53. Holotype ♀, SWITZERLAND: Valais, B. St. Pierre, fin ix.1916 (Coll. Cenitti) (MZ, Lausanne).

Paratypes. SWITZERLAND: 1 ♀, Geuroz, 1.viii.1940 (*J. de Beaumont*) (BMNH); 1 ♂ (Coll. E. Favre); 3 ♀, Neuchâtel, Corcelles, Environs de Neuchâtel, 24.viii.1912 (Coll. B. Jacob) (BMNH) (MZ, Lausanne); 1 ♀, without precise data, '4918' det. 'Allantus sulphuripes' (MN, Lausanne).

The holotype is in good condition.

Tenthredo celtica Benson, 1953*f* : 275. Holotype ♀, GREAT BRITAIN: England, Hertfordshire, Tring, 6.vi.1953 (*R. B. Benson*) (BMNH, No. 1.735).

Paratypes. GREAT BRITAIN: 6 ♀, 8 ♂, same data as the holotype (BMNH); 50 ♀, 37 ♂, England, Somerset, Hants, Sussex, Surrey, Kent, Berks, Herts, Beds, Northants, and Lancs.; Wales, Monmouth; Scotland, Dumfries. IRELAND: 3 ♂, 11 ♀, Counties Cavan, Meath, Dublin, Kildare and Wicklow, v–vi. belonging to Messrs R. C. Faris and A. W. Stelfox. SPAIN: 1 ♀, Barcelona, Vilatorta, Bofill (Dusmet Coll.) (IEE, Madrid). ITALY: 1 ♂, 3 ♀, Bologna, Gaibola, iv–vi, 1948–50 and 3 ♀, Ronzano, iv–v. 1942–48 (*R. Grandi*) (IE, Bologna).

The holotype is in good condition.

Tenthredo chlorosoma Benson, 1943*h* : 139, 143. Holotype ♂, CZECHOSLOVAKIA: Bohemia, Chodau, bred from larvae on *Salix alba* L., *S. purpuraea* L. and *Alnus glutinosa* L., bred from larva described by Stein (1880) (*R. von Stein*) (BMNH, No. 1.721).

Paratypes. GREAT BRITAIN: 9 ♂, 14 ♀, same data as the holotype (BMNH); 5 ♂, 4 ♀, England (Stephens Coll.) (BMNH); 1 ♀, England, Middlesex, Uxbridge (*J. Waterston*) (BMNH); 1 ♀, England, Bucks, Denham, 19.vi.1926 (*J. Waterston*) (BMNH); 1 ♀, England, Berks, Windsor Forest, vii.1930 (*H. St. J. K. Donisthorpe*) (BMNH); 1 ♀, England, Aylesbury, 1.vi.1942 (*R. B. Benson*) (BMNH); 4 ♂, 10 ♀, England, Linslade, Slapton, 28.v.1943 (*R. B. Benson*) (BMNH); 1 ♀, England, Herts, Bricket Wood, 21.v.1943, 1 ♀, same data except date 28.v.1943 (BMNH); 1 ♂, England, Cambs, Wicken Fen, 27.vii.1924 and 1 ♀, same data except date 3.viii.1924 (*R. B. Benson*) (BMNH); 1 ♂, England, Devon, Newton Abbot, 16.vi.1929 (*R. C. L. Perkins*) (BMNH); 1 ♂, England, Yorks, Keighley (*J. Wood*); 1 ♀, Wales (*J. Foxcroft*); 1 ♂, Scotland, Dumfries, Gretna, 26.viii.1930, 2 ♀, same data except dates 29.vi.1931 and 2.viii.1929 (*J. Murray*) (BMNH); 1 ♂, Scotland, Perthshire, Killin, 26–30.vi.1932, 2 ♀, same data except date 31.v–14.vi.1932 (*R. B. Benson*) (BMNH). FRANCE: 1 ♀, Puy de Dôme, Le Mont Dore, 24.vi.–6.viii.1934 (*M. E. Mosely*) (BMNH); 2 ♀, Haute-Garonne, Muret, 19–25.vi.1933, 1 ♀, St Béat, 14.vii–18.viii.1933 (*M. E. Mosely*) (BMNH); 6 ♀, Corréze, Bort-les-Oruges, 15–23.vi.1934 (*M. E. Mosely*) (BMNH). SWEDEN: 1 ♂, Skåne, Höör district, 16.vi.1938 (*D. M. S. & J. F. Perkins*) (BMNH); 1 ♀, Ring sjö, 24.vi.1938 (*D. M. S. & J. F. Perkins*) (BMNH). POLAND: 2 ♀, Pomorze, Sepolno, 29.vi.1926 (*G. Heinrich*) (BMNH). U.S.S.R.: 1 ♀, Siberia, 'Salair' (*Dr Finch*) (BMNH).

The holotype has only five segments of the left antenna and only two segments of the right antenna remaining.

Tenthredo dryas Benson, 1943*h* : 139, 142. Holotype ♂, GREAT BRITAIN: England, Herts, Bricket Wood, 30.v.1940 (*R. B. Benson*) (BMNH, No. 1.722).

Paratypes. GREAT BRITAIN: 1 ♂, 1 ♀ (allotype), same data as the holotype (BMNH); 2 ♂, 2 ♀, same data as the holotype except date, 21.v.1943; 8 ♂, 9 ♀, same data except date

28.v.1943 (*R. B. Benson*) (BMNH); 1 ♀, England, Middlesex, Ruislip, viii.1939 (*R. B. Benson*) (BMNH); 1 ♂, Stephens Coll. (BMNH). NORWAY: 1 ♀, vi–viii.1938 (*J. L. Chaworth-Musters*) (BMNH). FINLAND: 1 ♂, Kuusamo Village, 22.vi.1935 (*G. J. Kerrich*) (BMNH). CZECHOSLOVAKIA: 1 ♀, Bohemia (*Prof. Kheil*) (BMNH); 2 ♀, Bohemia, Chodau (*R. von Stein*) (BMNH).

The holotype is in good condition.

Tenthredo ebba Benson, 1941*c* : 86.

Replacement name for *Tenthredo simulans* Cameron, 1877, junior primary homonym of *Tenthredo simulans* Klug, 1818. [Benson in error cited Cameron, 1887.]

Tenthredo euphorbiae Benson, 1968*a* : 177. Holotype ♀, TURKEY: Trabzon, Songonali Gecidi, 2600 m, on flowers of *Euphorbia* 27.v.1962 (*Guichard & Harvey*) (BMNH, No. 1.819).

Paratypes. 6 ♂, 47 ♀, same data as holotype (BMNH).

The holotype is in good condition.

Tenthredo hyrcana Benson, 1968*a* : 171, 172. Holotype ♀, U.S.S.R.: Transcaucasia, Armenia, Delizhan, 1000–2200 m, 16.vi.1934 (*A. N. Zhelochovtsev*) (BMNH, No. 1.818).

Paratypes. TURKEY: 1 ♂, same data as the holotype (BMNH); 1 ♀, Ankara, Idris Dagi, 1300 m, 30.vi.1962 (*Guichard & Harvey*) (BMNH); 12 ♂, Amasya, 500 m, 22–23.v.1959 (*Guichard*) (BMNH); 1 ♂, same data except height 460 m (BMNH); 2 ♂, 1 ♀, same data except date 2–6.vi.1959 (BMNH); 1 ♂, Ersurum, Ispir, 20 km on Ikisdere rd, 700 m, 2.vi.1962 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Tenthredo lovetti Benson, 1930*a* : 107.

Replacement name for *Tenthredo rustica* MacGillivray, 1923, junior primary homonyn of *Tenthredo rustica* Linnaeus, 1758.

Tenthredo maculata subsp. ***diana*** Benson, 1968*a* : 174. Holotype ♀, ITALY: Emilia Mt, Breta, 1.v.1912 (*A. Fiori*) (cited as MCSNGD, Genoa).

Paratypes. ITALY: 1 ♀, Emilia, La Lama, 10.vi.1962 (*A. Servadei*) (IEA, Padua); 1 ♀, Marches, Catria, v.1933 (*Alzona*) (BMNH).

Although the holotype is published as being housed in the MCSNGD, Genoa, it cannot be traced in their collection.

Tenthredo mioceras Benson, 1943*h* : 138, 140. Holotype ♀, GREAT BRITAIN: Scotland, Angus, Glen Cova 1000 ft, 11–30.vi.1939 (*R. B. Benson*) (BMNH, No. 1.751).

Paratypes. GREAT BRITAIN: 2 ♀, same data as the holotype (BMNH); 1 ♀, same data as the holotype except height 2000–3000 ft, (BMNH); 1 ♀, Scotland, Perthshire, Rannoch, 15–16.vi.1931 (*R. B. Benson*) (BMNH); 1 ♀, Scotland, Aberdeen, Ballater, 10.vii.1915 (*J. J. F. X. King*) (UM, Glasgow); 1 ♂ (allotype), Scotland, Inverness, Nethy Bridge, 10.vii.1911 (UM, Glasgow). IRELAND: 1 ♂, Cavan, Cornafean, Sloans Fort, 9.vi.1934 (R. C. Farris Coll.); 2 ♀, same data except date 12.vii.1941 (BMNH). CZECHOSLOVAKIA: 15 ♂, 41 ♀, Bohemia, Chodau (*R. von Stein*) (BMNH). POLAND: 1 ♂, 2 ♀, Tatra Mountains, 3000 ft (*Zakopane, D. Aubertin & E. Trewavas*) (BMNH). AUSTRIA: 1 ♀, Tyrol, Mittelberg, 20.vi.1930 (*O. W. Richards*) (BMNH). FRANCE: 7 ♀, Puy-de-Dôme, Le Mont Doré, 24.vi.–6.viii.1934 (*M. E. Mosely*) (BMNH); 1 ♀, Hospice de France, 11.vii.1933; 1 ♀, Luchon, 25.vii.1933 (*M. E. Mosely*) (BMNH); 1 ♀, Hautes-Alpes, Ailefroide, 19.vii.1931 (*O. W. Richards*) (BMNH).

The holotype is in good condition. A determination label by Benson was not attached to the holotype; I have attached one.

Tenthredo pallidula Benson, 1930*a* : 107.

Replacement name for *Tenthredo albiventris* Mocsáry, 1880, junior primary homonym of *Tenthredo albiventris* Klug, 1814.

Tenthredo titania Benson, 1959*f* : 98, 101. Holotype ♀, U.S.S.R.: Transcaucasia, Georgia, Akhaltsikh, 1885 (ZSBS, Munich).

Paratypes. U.S.S.R.: 1 ♀, same data as the holotype (BMNH); 1 ♀, Transcaucasia, Borsham, Svanetia inf., 17.vii.1911 (*A. Schelkovmikov*) (ZSBS, Munich).

The holotype is in good condition.

Tenthredo umbrica Benson, 1959*f* : 98, 100. Holotype ♀, ITALY: Umbria, Pian Perduto, Mount Sibillini, vii.1954 (VM, Verona).

Paratypes. ITALY: 1 ♀, same data as the holotype (VM, Verona); 1 ♂, same data (VM, Verona); 1 ♀, Forca Viola (*S. Rufo*) (BMNH); 1 ♀, Pian Grande (*S. Rufo*) (BMNH).

The holotype is in good condition.

Tenthredo variana Benson, 1930*a* : 107.

Replacement name for *Tenthredo variabilis* Mocsáry, 1909, junior primary homonym of *Tenthredo variabilis* Klug, 1844.

Tenthredopsis convergens Benson, 1954*d* : 282, 283. Holotype ♂, ISRAEL: Elon, 16.vii.19— (*B. N. Bytinski-Salz*) (BMNH, No. 1.716).

The holotype has two segments of the left antenna missing and only seven segments of the right antenna remain. The genitalia of the holotype are mounted on a slide labelled '22.ix.52–1.J.Q.'

Tenthredopsis guichardi Benson, 1968*a* : 158, 162. Holotype ♀, TURKEY: Ankara, Kubuk, 830 m, 22.v.1960 (*Guichard & Harvey*) (BMNH, No. 1.816).

Paratypes. 3 ♂, 5 ♀, same data as the holotype except date 21–22.v.1960 (*Guichard & Harvey*) (BMNH).

The holotype is in good condition.

Tenthredopsis harveyi Benson, 1968*a* : 158, 163. Holotype ♀, TURKEY: Bolu, Ala Dagi, 2000 m, Kastal Kaya Tepe, 15.vii.1962 (*Guichard & Harvey*) (BMNH, No. 1.817).

The holotype has four segments only of the left antenna remaining.

Urocerus gigas subsp. ***taiganus*** Benson, 1943*c* : 39. Holotype ♀, FINLAND: watershed between 70° 0′–70° 17′N. and 25° 50′–26° 55′E., 1000–2000 ft, 19–20.vii.1938 (*A. F. O'Farrell*) (BMNH, No. 1.44).

Paratypes. FINLAND: 1 ♀, same data as the holotype (BMNH); 1 ♀, near Kunes, coastal area between 70° 17′–70°23′ N. and 26°40′–26°55′ E., 23.vii.1938 (*A. F. O'Farrell*) (BMNH). U.S.S.R.: 1 ♀, North Russia, Kola Gulf, vii.1918 (*A. G. Garment*) (BMNH); 3 ♀, Siberia (Cameron Coll.) (BMNH); 1 ♀, S. W. Siberia, Kolpaslevo, 20.vii.1924 (*G. Bei-Bienko*) (BMNH).

The holotype is in good condition except that only two segments remain of the right antenna.

Urocerus gigas subsp. ***tibetanus*** Benson, 1943*c* : 39. Holotype ♀, CHINA (cited as Tibet): Zayul, Atakawg, 1300 ft, 9.viii.1933 (*F. Kingdon-Ward & R. J. H. Kaulback*) (BMNH, No. 1.43).

Paratype. Tibet: 1 ♀, 28°25′ N., 95°55′ E., 10 000–12 000 ft, 11.ix.1931 (*F. Kingdon-Ward*) (BMNH).

The holotype is in good condition.

Urocerus niger Benson, 1943*c* : 48. Holotype ♀, CHINA (cited as S.E. Tibet): Zayul, 7000–12 000 ft, summer 1935 (*R. J. H. Kaulback*) (BMNH, No. 1.42).

The holotype is in good condition except that 12 segments only remain of the left antenna.

Xenapates abyssinica Benson, 1939*e* : 120. Holotype ♂, ETHIOPIA: Bahar-dar, L. Tana, vii.1936 (*G. Guiglia*) (MCSNGD, Genoa).

The holotype is in good condition.

Xenapates fuscipes Benson, 1939*e* : 120. Holotype ♀, ETHIOPIA: Bahar-dar, L.Tana, vii. 1936.

Paratype. 1 ♂ (allotype), same data as the holotype (BMNH).

The holotype is in good condition.

Xenapates similis Benson, 1939*e* : 121. Holotype ♀, RHODESIA: Sawmills, 27.xii.1920 (BMNH, No. 1.333).

The holotype is in good condition except that the left hind tarsus is missing.

Xiphidiaphora erebus Benson, 1954*h* : 161. Holotype ♀, VIETNAM (NORTH) (cited as Indo China): Tonkin, Chapa, 21.v.1916 (*R. V. de Salvaza*) (BMNH, No. 1.658).

The holotype is in good condition.

Xiphydriola quadricincta Benson, 1935*c* : 168. Holotype ♀, JAVA: Pekalongan Province, vii. 1928 (*L. G. E. Kalshoven*) (RNA, Leiden).

The holotype is in good condition.

Xyela curva Benson, 1938*a* : 35, 36. Holotype ♀, AUSTRIA: Wiessenbach, River Triesting, v.1883 (Kolazy Coll.) (cited as NM, Vienna).

Paratypes. AUSTRIA: 4 ♂ (including allotype), Mauer, 15.iv.1869, 1 ♀, 'auf Betula Stammen', 15.v.1869 and 1 ♀, without data (Mann Coll.); 3 ♀, River Triesting, 1867 and 1 ♀, 1868 (Tschek Coll.); 1 ♀ (Kolazy Coll); 4 ♀ (Ullerich Coll.); 2 ♀ (Simony Coll,); 1 ♂, 1 ♀, no data.

All are labelled 'juli det. Konow.' Benson states that all are in the NM, Vienna, except for 1 ♂, 4 ♀, in the BMNH.

I have been unable to confirm the location of the holotype; Dr Max Fischer informs me that it is missing from the NM, Vienna.

In the BMNH collection are 1 ♂, 2 ♀ paratypes, 1 ♂ same data as the allotype, 1 ♀, without data, 1 ♀ (Simony Coll.).

Xyela menelaus Benson, 1960*b* : 111. Holotype ♀, GREECE: Peloponnesos, Taiyetos Mountains, 21.v.1935 (*J. Aubert*) (MZ, Lausanne).

The holotype is in good condition.

Xyelatana helvetica Benson, 1961*i* : 171. Holotype ♀, SWITZERLAND: Grisons, Val Ftur, near Il Fuorn, 1900 m, 23.iv.1953 (*J. Aubert*) (BNN, Chur).

The holotype is in good condition.

Xyloperga forsiusi Benson, 1939*g* : 332. Holotype ♀, AUSTRALIA: Victoria, no other data, label reads 7 (16.x.1934) publ. as (NMV, Melbourne) should read (QM, Brisbane, T.5945).

Paratype. AUSTRALIA: 1 ♀, Canberra, F.C.T. 8.xi.1929 (*G. A. Waterhouse*) (ANIC, Canberra).

The holotype is in good condition; the genitalia are mounted on a slide.

Xyloperga perkinsi Benson, 1935*e* : 227. Holotype ♀, AUSTRALIA: Western Australia, Cunderdin, (QM, Brisbane, T.5946).

Paratypes. 1 ♂ (allotype), same data as the holotype (QM, Brisbane, T.5947); 1 ♂, same data (QM, Brisbane, T.5943); 1 ♂, 1 ♀, same data (BMNH); 1 ♀, same data (paratype var.) (QM, Brisbane, T.5954).

PART II. A BIBLIOGRAPHY OF BENSON'S WORKS

The bibliography is arranged in chronological order with conjoint papers following in alphabetical order. Reviews are listed separately. Except for one joint paper with O.Conde, which is in German, they are all in English.

Works other than reviews

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—— 1926. A Nematode worm parasitising a sawfly larva. *Entomologist's mon. Mag.* **62** : 140–141.

—— 1928. A preliminary account of the sawflies of Wicken Fen. *Natural History of Wicken Fen* Pt. 4 : 313–323. Cambridge.

—— 1930*a*. Nine sawflies requiring new names. *Entomologist* **63** : 107.

—— 1930*b*. On the occurrence of the sawfly *Arge ciliaris* L., in Britain. *Entomologist's mon. Mag.* **66** : 113–114.

—— 1930*c*. Sawflies collected by the Oxford University Expedition to British Guiana, 1929. *Ann. Mag. nat. Hist.* (10) **6** : 620–621.

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—— 1934*g*. The Linnean types of sawflies (Hymenoptera Symphyta). *Ark. Zool.* **26** (20) : 1–14.

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THE BRITISH TACHINIDAE OF WALKER AND STEPHENS (DIPTERA)

R. W. CROSSKEY

BULLETIN OF
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ENTOMOLOGY Vol. 30 No. 5
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BY

ROGER WARD CROSSKEY

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THE BRITISH TACHINIDAE OF WALKER AND STEPHENS (DIPTERA)

By R. W. CROSSKEY

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SYNOPSIS

The results are presented of an investigation into the long-neglected names that Walker and Stephens proposed for British Tachinidae or British species ascribed to Tachinid genera. The identities of the species to which the names apply are established after study of the extant types: types are lost of nearly half of Walker's British nominal species and 56 names remain *nomina dubia*. Nineteen previously established specific synonyms are confirmed, 49 new specific synonyms are established, and there are four new combinations. Lectotypes are designated for 13 nominal species, three of Walker and ten of Fallén (the latter being senior synonyms of Walker names). The generic name *Triarthria* Stephens is shown to be available and is established as a senior synonym for *Bigonicheta* Rondani; two other generic names are placed as new synonyms of *Triarthria*.

INTRODUCTION

It is a fact of taxonomic life that to ignore names does not make them go away, yet it has been the practice among British dipterists – it seems almost wilfully – to neglect the names proposed for British flies by Walker and Stephens. To disregard the names of Stephens was perhaps permissible as they were almost all *nomina nuda*, but Walker's names were accompanied by detailed (albeit fairly useless) descriptions, and, furthermore, were nearly all published in the easily accessible work entitled *Insecta Britannica, Diptera* (volumes 1–3). Earlier generations of dipterists can therefore hardly have the excuse that they did not know of Walker's work.

Neglect of Walker's British Tachinidae has been almost total, despite the fact that they muster (including those described in *Tachina* Meigen but known not to be true Tachinidae) no fewer than 117 nominal species. None of the specialists on British Tachinidae (Wainwright, Day, van Emden) mentioned any of Walker's species or placed any of his names, and regrettably they were all omitted by Kloet & Hincks (1945) from their *A Check List of British Insects*.

The preparation of the Diptera volume for the revised edition of 'Kloet & Hincks' has prompted the present study of the British Tachinidae described or named by Walker and Stephens, so that the names can be placed as reliably as possible, and the omission from the first edition remedied. The essence of a good catalogue or check-list is that it should at least account for all the names involved in the group under consideration, even if those names cannot in the state of knowledge be accurately interpreted and even if they lack status in zoological nomenclature. In this respect, it is of interest to note, the early Diptera lists of White (1853) and Verrall (1888; 1901) were superior to the list of Kloet & Hincks (1945) since they did at least record some or most of Walker's British names. These lists all omitted Stephens's names, probably because they are almost all *nomina nuda*, but it has been thought logical to account for Stephens's names in the present paper because some of them were used and given nomenclatural availability by Walker (who had access to the Stephens collection).

Type-specimens have been located for about half of the nominal species here concerned that Walker described; the remainder have not been found and are deemed to be lost. Most of the types are in the British Museum (Natural History) and were found in a special cabinet containing the amalgamated remnants of Stephens's and Walker's collections of Diptera; they have now been removed from this cabinet and placed together in a drawer in the collection of British dipterous types. A few types are in the University Museum, Oxford, these all being specimens that Walker described from the collection (now mostly lost) of Desvignes.

The interpretations of names after study of the types, or decisions as to their status in the absence of types, that are given in this paper form the basis upon which the Walker and Stephens names will be recorded in the forthcoming Diptera volume of the new Kloet & Hincks's *Check List of British Insects*.

RECOGNITION OF WALKER'S BRITISH TYPES

Francis Walker described 116 nominal species from 'England' that he assigned to the genus *Tachina* Meigen and one nominal species from 'England' that he assigned to the genus *Dexia* Meigen. In addition to these he described three nominal species (one *Dexia*, two *Tachina*) from unknown localities that almost certainly had a British provenance, and published four replacement names for his own homonyms. There is therefore a total of 124 Walker names for British Tachinidae and allied forms to be accounted for in the British fauna.

These names were published in only two works, namely Walker's (1849) *List of the Specimens of Dipterous Insects in the Collection of the British Museum* (Vol. 4), and his (1853) *Insecta Britannica, Diptera* (Vol. 2). Twenty-four of the nominal species were described in the 1849 work and the other 96 in the 1853 work; the latter also contains the four replacement names.

The type-specimens of the nominal species described in 1849 were all found in the collection of the British Museum (Natural History) many years ago and labelled to show their identity by Major E. E. Austen. Each such type bears a circular green-edged type label on which Austen wrote the name in black ink, and usually also a pencilled label in Austen's hand reading 'England'. Some of these types were the subject of published notes by Austen (1907) indicating their identities. The recognition of Walker's (1849) types therefore presented no problems.

The type-specimens on which Walker's (1853) descriptions were based had not, however, been previously recognized and labelled as such except for a few which Walker had recorded as being in Desvignes's collection; a few specimens were found in the University Museum at Oxford and in the British Museum (Natural History) (hereafter abbreviated to BMNH) bearing old labels that gave a Walker name and the statement '. . . Walker's original type from Desvignes' collection' (the hand-writing being unrecognized but possibly Verrall's) and comparison of such specimens with the descriptions left no doubt that they are indeed primary types of the nominal species named on the labels.

Most of the extant Walker (1853) types are in the BMNH and stood amongst the Stephens collection, but when found were easily differentiated from Stephens's own specimens by the nature of the labels standing beneath the specimens. The specimens themselves bore no labels, but the identities were at once evident from printed name labels associated with the specimens and pinned into the Stephens-Walker cabinet just below them; comparison of the specimens so-named with the descriptions showed that the labelling could be relied upon. The printed labels were found to be of two kinds, and it was quickly obvious that one kind had been cut from Stephens's (1829*a*) *Nomenclature of British Insects* and the other kind from White's (1853) *List of the Specimens of British Animals in the Collection of the British Museum*, Part XV (Diptera). The kind of label differentiated the older Stephens material from the later Walker material that had been placed with it.

The Stephens name labels consist simply of his name for the species in Roman type followed by his 'mihi' suffix in italics: e.g. 'nigrolineata *mihi.*'. The White name labels for Walker's species consist of a serial number, followed by the specific name in Roman type and Walker's abbreviated name in italics: e.g. '122 delitescens *Walk.*'.

It is important to note a cause of consistent discrepancy of one number between the serial numbers given by Walker (1853) to his species and the serial numbers given in White's list. Walker's (1853) serial numbers for his species of British *Tachina* ran from No. 1 on p. 19 to No. 166 on p. 92, but there was no species with the serial number 51 and Walker himself noted this omission in a footnote on p. 41; thus Walker's series went from '50 *exacta*' to '52 *agilis*'. White (1853) produced his list from Walker's (1853) publication, which had just appeared in the same year, but to avoid the omission of No. 51 he renumbered all of Walker's series from 52 onwards; thus *agilis* became 51, not 52, and so on throughout the series to the last *Tachina* species which became 165, not 166. As a result, the printed numbers on the White labels (which are now removed from the cabinet and attached to the appropriate types) when in excess of 51 all differ by one from the serial number given by Walker and quoted in the references to the nominal species in the present listing.

In none of his descriptions of British Tachinidae did Walker state either the sex or the number of specimens he had, and for only two nominal species out of the sixty for which surviving type-material has been found is there more than one original type (these are *T. commissa* and *T. intersecta* for which two syntypes each have been found and for which lectotypes are designated). The presumption is, therefore, that virtually all of Walker's nominal species were based on a single specimen, since there is no contrary evidence in the descriptions (such as a size range); the only exception to this is *T. comosa* for which a size range is given, thus suggesting at least two original specimens (only one exists and is designated as lectotype). It is specially likely that Walker had only one specimen of nearly all his species because he had no idea, it seems, of intraspecific variability: Austen (1907 : 326) pointed this out in a little-known remark that deserves quotation: 'As proving that Walker described the *specimen*, and not the species, the characters of which he was generally incapable of grasping, it may be mentioned that he is responsible for no fewer than eleven synonyms of the well-known *Eutachina rustica*, Mg. [now *Exorista rustica*], the description in every case being based upon a single specimen.'

When only a single type-specimen has been found, and there is no evidence that more than one original specimen existed, that type-specimen has been accepted and is cited as the 'holotype', since it is in my view undesirable to adopt the practice of some workers and designate such specimens as lectotypes. (This is elaborated further in the following section.)

HOLOTYPE OR LECTOTYPE? THE STATUS OF A SINGLE EXTANT TYPE FROM A TYPE-SERIES OF UNKNOWN SIZE

Sooner or later every practising taxonomist, at least in the field of entomology, meets the situation where for some particular nominal species-group taxon three factors coincide: (1) there was no originally designated type-specimen; (2) it cannot be ascertained with certainty how many specimens composed the type-series; and (3) only one extant type-specimen can be found. Such situations are commonplace, especially when dealing with the type-material of pre-20th century authors for whom it was not the custom to state how many specimens they had before them when drawing up their descriptions.

The question then arises – what is the status of the single extant type-specimen?

Should it be treated as the *holotype*, on the assumption that no other original specimens existed, until proved otherwise, or should it be designated as the *lectotype* on the assumption that it was probably only one of a multiple type-series?

In practice it appears that most taxonomists answer these questions by following what others do in their particular group, rather than by deliberating on the balance of the arguments and deciding for themselves: in this way it has come about, for instance, that dipterists tend to be 'holotypists' and hemipterists tend to be 'lectotypists'. Each group tends to cling rather tenaciously to its viewpoint and to quote the gospel of the *International Code of Zoological Nomenclature* in defence of it; yet the *Code* is in reality none too helpful on the point, particularly as it implies two definitions for a 'holotype' in Article 73 but only one in the Glossary (an anomaly touched upon further below).

It seems to me that the arguments are overwhelmingly in favour of treating single extant types (of the kind under discussion) as holotypes, and therefore against their designation as lectotypes, and it is my aim in the present section to put forward the reasons for this viewpoint. The principles that I apply in the present paper, and have consistently applied in taxonomic practice, may be put into words as follows:

(1) *If a nominal species-group taxon was based upon an unstated number of specimens and had no originally designated type-specimen, a single extant type is the holotype* (*unless contrary evidence from any source exists or until it is obtained*).

(2) *If it is later proved that other type-material exists then the specimen hitherto recognized as holotype becomes one of a syntype series from which any specimen may be designated as the lectotype.*

There is nothing in the procedure just outlined that, in my view at least, could be considered contrary either to the letter or the spirit of Article 73 of the *Code*. In this Article it is made clear that there are *two* circumstances in which a nominal species has a holotype (the *Code* uses 'species' but 'species-group taxon' is meant): the first circumstance (lettered '(a)' in the *Code*) is that in which the nominal species 'is based on a single specimen', *without any qualification requiring that this is made evident in the original publication*: the second circumstance (lettered '(b)' in the *Code*) is that in which the describer designates or indicates in the original description that only one specimen is the 'type'. Regrettably, however, the Glossary (*Code*, p. 149) defines 'holotype' in only *one* way, namely as the kind of holotype specified in Article 73(b), and in this respect there is a discrepancy between the text of the *Code* and its Glossary. In this situation it should be the text that is definitive, and it follows therefore that a type-specimen of the kind defined in the text of Article 73(a) is just as much a 'holotype' as the kind referred to in Article 73(b) and the Glossary.

It is clear from this that when only one type-specimen of a nominal species-group taxon can be found, and there is no originally designated 'type' or evidence of the number of original specimens, that extant type-specimen *can* be the holotype (i.e. there are no grounds under the *Code* for supposing that it should automatically be designated as the lectotype even though it is theoretically possible that the one extant specimen is the only survivor from a multiple type-series). It is my argument here that it is, in fact, undesirable on several grounds to designate such a specimen as lectotype (even though it can permissibly be so designated under the *Code*). The main objections to lectotype designation may be put as follows:

(1) It is binding on future zoologists and ties the name in perpetuity to the one extant specimen.

[It may be that the extant specimen is damaged or belongs to the sex not habitually carrying the best characters. A subsequently discovered syntype could not be made the name-bearing specimen, even though it might have been a better specimen for lectotype designation either on practical or nomenclatural grounds.]

(2) It is based on the subjective surmise that the type-series consisted of multiple specimens.

[It is objective fact that there must have been at least one original specimen whereas it is in the realm of conjecture that there were more.]

(3) It is, for most groups at least, contrary to probability that the type-series ever contained more than a single specimen.

[It is mainly the species-group taxa of early authors that are involved in the situations under discussion. In these earlier times it was commonplace for taxa to be described from lone specimens, though in certain orders it was more usual than in others for describers to have more than one original specimen. For many groups, at least, single type-specimens were the norm upon which nominal species-group taxa were based.]

(4) It imposes upon later workers the obligation to cite the names of the designators and the references to the designations (e.g. in catalogues).

[This is a minor objection but relevant, since the imposition is a needless one.]

(5) It will incline other workers to presuppose the existence of paralectotypes when none in fact exist.

[The very fact of designation of a lectotype leads other workers immediately to assume that evidence exists that the original material consisted of two or more syntypes, whereas in the cases here concerned there is no such evidence. Lectotype designation and the absence of paralectotypes could be confusing to other workers, since designation of a lectotype normally *implies* very strongly either that multiple syntypes still exist or that there is certain evidence that they once existed.]

The reasons why I prefer to recognize single extant type-specimens of the kind under discussion as holotypes, and not to designate them as lectotypes, can be inferred from the arguments against lectotype designation adduced above, but it may nevertheless be useful to summarize them thus:

Recognition as holotype: (1) does not tie the hands of a future zoologist if additional type-specimens are discovered, who remains free to designate the most appropriate specimen; (2) is consonant with the fact that at least one specimen *must* have existed whereas more than one *may* have existed; (3) is consonant with the fact that most frequently the description would have been based only on one specimen; (4) imposes no practical 'recording' burden on other workers; and (5) does not mislead other workers into assuming that syntypes were known positively to exist or have existed.

From item (1) enumerated above it will be evident that recognition of the single extant specimen does not, in my view, automatically make it a lectotype if other specimens (syntypes) are discovered. (Here it may be noted that there are, of course, many instances in taxonomic practice where an author is deemed to have fixed a lectotype, even though he did not use this term for the single name-bearing specimen; in these instances the author was aware at the time of his publication that more than one original specimen existed and his citation of one specimen, by whatever terminology, as type had the intention of fixing the name to that specimen.)

EXPLANATORY COMMENTS ON THE FORMAT ADOPTED

The nominal species-group taxa are listed in alphabetical order of their original combinations, and for each name the entry is arranged in the following sequence.

Name; author; date and page reference of original publication; serial number of the nominal species in the original publication (if any); status and sex of primary type (if known); present lectotype designation (when necessary); locality of primary type; type-depository.

Number and sex of paralectotypes if such exist, with data and depository information as for primary types.

Statement on the condition and labelling of the type-material.

A statement (prefixed '*Identity*.') on the generic placement and taxonomic validity of the name, accompanied when known by similar data to that outlined above for the names of senior or junior synonyms.

The following points should be noted with regard to the information supplied:

1. *Lost types*. For many nominal species the type-material is lost and there is no evidence on the number of original specimens or their sex; in these cases the statement 'Type(s) [? sex]' is used to indicate the lack of information. Very rarely it is clear from a size range given in the description that there must have been at least two specimens, and such cases are recorded as 'Syntypes [? sex]'. When types have not been located the word 'lost' is given in parentheses after the locality.

2. *Locality*. The British Tachinidae described by Walker were all recorded as from England without any further locality data. In the 1853 work Walker indicated this locality simply by use of the letter 'E'. The locality has been recorded simply as 'ENGLAND'.

3. *Type-depositories*. As these are given for the primary types of the synonyms of Walker's names as well as for Walker's nominal species there are several type-depositories involved. The following abbreviations are used to indicate these:

BMNH	British Museum (Natural History), London.
MNHN	Muséum National d'Histoire Naturelle, Paris.

MZ	Museo Zoologico 'La Specola', Florence.
NM	Naturhistorisches Museum, Vienna.
NR	Naturhistoriska Riksmuseum, Stockholm.
UM	University Museum, Oxford.
UZI	Universitetets Zoologiska Institution, Lund.

WALKER'S NAMES IN THE BRITISH TACHINIDAE

Note: names of nominal species that were assigned by Walker to *Tachina* but are now known not to apply to Tachinidae are included, for convenient cross-reference, in the list that follows but are printed in non-bold italics and are enclosed in square brackets. Names that are junior homonyms are in non-bold italics but not bracketed. The numbers given in brackets following the page-references are the serial numbers given to the nominal species by Walker with the original descriptions.

Dexia fingens Walker, 1853 : 98 (No. 7). Type(s) [♂], England (lost).

Identity. Unknown, the name remains a *nomen dubium.* Walker's (1853 : 94–99) sense of *Dexia* Meigen included species now assigned to the genera *Mintho* Robineau-Desvoidy, *Estheria* Robineau-Desvoidy, *Phyllomya* Robineau-Desvoidy, *Thelaira* Robineau-Desvoidy and *Dexiosoma* Rondani. It is impossible to deduce the identity of *D. fingens* from the description, although this clearly applies to a male specimen.

Tachina accidens Walker, 1853 : 89 (No. 160). Holotype ♂, England (BMNH, ex coll. Walker).

The holotype has the thoracic dorsum damaged, has lost the last four segments of each hind tarsus and has some fungal threads, but is otherwise in good condition. It bears a printed label '159 accidens *Walk.*'.

Identity. **Syn. n.** of ***Phyllomya volvulus*** (Fabricius, 1794 : 328 (*Musca*)), type(s) [? sex], Italy (lost or destroyed, except one wing).

Tachina admete Walker, 1849 : 743. Holotype ♂, England (BMNH).

The holotype has lost the left fore and mid legs, the right mid leg, and some setae, and the thorax is greasy. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, Sweden (NR, Stockholm) [examined and herein designated]. The synonymy of *admete* with *rustica* was first established by Austen (1907 : 329) and has been confirmed during the present work by examination of the holotype genitalia.

Tachina ambivius Walker, 1849 : 754. Holotype ♀, England [?] (BMNH).

The holotype is in fair condition, but has lost both hind legs and the left arista; the mesonotum and scutellum are rubbed and most of the frontal setae are missing. It bears a circular green-edged type label on which Austen has written the name in black ink, and a label in Wainwright's writing that reads 'CHAETOLYA ambivius Walk = setigena Rond ♀'.

Identity. Valid senior synonym for *Chetina setigena* Rondani, new combination ***Chetina ambivius*** (Walker) **comb. n.** here established. *C. setigena* Rondani, 1856 : 65, holotype [? sex], Italy (MZ, Florence) [examined by Herting], here established as a junior synonym (**syn. n.**) of *C. ambivius* (Walker, 1849).

Dr Herting has examined the holotype of *ambivius* and confirms that the name applies to the same species as Rondani's *setigena.* Wainwright had evidently realized this, as he had attached a label to the holotype indicating the synonymy, but so far as I can trace the synonymy was not established by Wainwright in publication and is therefore new. (The generic name *Chaetolya* on Wainwright's label is a variant spelling of *Chetilya* Rondani, 1861, which itself appears to be a variant spelling of *Chetilia* Rondani, 1859, and is a junior synonym of *Chetina* Rondani, 1856; the last is also commonly known by the variant spelling *Chaetina*.)

The species here concerned, formerly known as *Chetina setigena*, is not known to be a British species, and it therefore appears possible that the holotype of *ambivius* does not have a British provenance. Walker recorded the locality as 'England' in the description, and Austen has attached a pencilled label to the holotype indicating England as type-locality, but there is no means now of discovering whether the specimen truly originated in Britain. *Chetina ambivius* (Walker) is mainly a central European species, and must be treated as very doubtfully British in the absence of later material confirming its existence in the British fauna.

Tachina amphiro Walker, 1849 : 749. Holotype ♂, ENGLAND (BMNH).

The holotype is in poor condition; the left legs, right fore leg and left wing are lost, the right wing damaged, the head badly crushed and the body greasy. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Phryxe heraclei*** (Meigen, 1824 : 339 (*Tachina*)), holotype ♂, GERMANY (MNHN, Paris) [examined by Herting]. Austen (1907 : 329) placed *amphiro* as a synonym of *Phryxe vulgaris* (Fallén, 1810), which was justified in the state of knowledge at that time, but examination of the holotype genitalia during the present work showed that *amphiro* is actually a synonym of *heraclei*, not of *vulgaris*.

Tachina augens Walker, 1853 : 73 (No. 124). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. The identity cannot be deduced from the description or from Walker's (1853 : 18) key placement, in which he associated *augens* (No. 124) with *delitescens* Walker (No. 123). The name appears certainly to have applied to a Tachinid.

Tachina bijuncta Walker, 1853 : 24 (No. 12). Type(s) [? ♂], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Bezzi (1907 : 211) doubtfully assigned *bijuncta* to *Ernestia* (*Ernestia*) Robineau-Desvoidy, presumably from the description, but there is nothing sufficiently tangible in the original description or in the key placement (Walker, 1853 : 15) for reliable generic assignment. Walker associated *bijuncta* in his key with *dispartita* Walker (No. 10) and *intracta* Walker (No. 11) but types of these are also lost.

Tachina broteas Walker, 1849 : 763. Holotype ♂, ENGLAND (BMNH).

The holotype has lost all left legs, the right fore leg and some scutellar setae, and has a tear near the base of the left wing but is otherwise in fair condition.

Identity. Junior synonym of ***Actia pilipennis*** (Fallén, 1810 : 273 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *broteas* with *pilipennis* was first established by Austen (1907 : 339) and is here confirmed after direct comparison of the primary types.

[***Tachina caminaria*** Walker, 1853. Not Tachinidae, see p. 298].

Tachina cerceis Walker, 1849 : 747. Holotype ♀, ENGLAND (BMNH).

The holotype is in very good condition. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *cerceis* with *rustica* was first established by Austen (1907 : 329) and is here confirmed.

Tachina certans Walker, 1853 : 74 (No. 125). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).

The holotype is in very good condition except for the loss of some tarsal segments. It bears a printed label '124 certans *Walk.*'.

Identity. **Syn. n.** of ***Timavia amoena*** (Meigen, 1824 : 264 (*Tachina*)), syntypes ♂ ♀, GERMANY (MNHN, Paris) [examined by Herting].

Tachina clymene Walker, 1849 : 784. Holotype ♂, ENGLAND (BMNH).

The holotype is in good condition except for loss of the left fore leg and tip of the right hind tarsus. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Zophomyia temula*** (Scopoli, 1763 : 330 (*Musca*)), type(s) [? sex], AUSTRIA (lost).

Tachina collecta Walker, 1853 : [298]. Replacement name for *Tachina neglecta* Walker, 1853 : 79, primary homonym of *Tachina neglecta* Walker, 1853 : 25.

Walker (1853) described two different species with the name *Tachina neglecta*, but published the replacement name *T. collecta* for the second use of the name *neglecta* in a table of 'Errata' on an unnumbered page immediately following the last numbered page of the work (p. 297). Type-information for *T. collecta* is given under *T. neglecta* (2), q.v.

Identity. **Syn. n.** of ***Phryxe vulgaris*** (Fallén, 1810 : 282 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♀ holotype of *collecta* = *neglecta* has been directly compared with ♀ paralectotypes of *vulgaris* as well as with the ♂ lectotype.

Tachina comitata Walker, 1853 : 55 (No. 83). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. The identity cannot be deduced from the description or from Walker's (1853 : 17) key placement, in which he associated *comitata* (No. 83) with *distenta* (No. 82); the type of the latter is also lost. *T. comitata* was described from Desvignes's collection.

Tachina commissa Walker, 1853 : 69 (No. 114). LECTOTYPE ♀, by present designation, ENGLAND (BMNH, ex coll. Desvignes).

Paralectotype: ♀, ENGLAND (UM, Oxford, ex coll. Desvignes).

The lectotype has lost the abdomen and the right hind leg but, apart from rubbing of the frontal setae, is otherwise in good condition. The paralectotype is in extremely bad condition, abdomen and mid and hind legs and right wing lost, both third antennal segments lost and a large hole in the thoracic dorsum; the parts that remain are mouldy. Lectotype and paralectotype are each labelled '*T. commissa*. Walker's original type from Desvignes' collection' in an unrecognized handwriting.

Identity. **Syn. n.** of ***Lypha dubia*** (Fallén, 1810 : 284 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The type-material of *commissa* has been directly compared with ♀ paralectotypes of *dubia* as well as with the ♂ lectotype. Bezzi (1907 : 222) wrongly placed *commissa* as a possible synonym of *Lydina aenea* (Meigen).

Tachina comosa Walker, 1853 : 75 (No. 128). LECTOTYPE ♂, by present designation, ENGLAND (BMNH, ex coll. Walker).

The description of this species gives a size range for body and wing length, from which fact it is evident that there was more than one original specimen. Only one syntype, however, has been found and this is designated as lectotype. The lectotype is in good condition except for a little mould and loss of the right fore tarsus; it bears a printed label '127 comosa *Walk.*'.

Identity. **Syn. n.** of ***Lypha dubia*** (Fallén, 1810 : 284 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♂ lectotypes of *comosa* and *dubia* have been directly compared.

Tachina computa Walker, 1853 : 64 (No. 103). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).

The holotype is in bad condition, very mouldy, both wings torn, left fore and hind legs lost, left mid tarsus lost, and right fore tarsus lost. It bears a printed label '102 computa *Walk.*'.

Identity. **Syn. n.** of ***Campogaster exigua*** (Meigen, 1824: 367 (*Tachina*)), holotype ♂, GERMANY (MNHN, Paris) [examined by Herting].

Tachina confecta Walker, 1853 : [298]. Replacement name for *Tachina defecta* Walker, 1853 : 46, primary homonym of *Tachina defecta* Walker, 1853 : 27.

Walker (1853) described two different species with the name *Tachina defecta*, but published the replacement name *T. confecta* for the second use of the name *defecta* in a table of 'Errata' on an unnumbered page immediately following the last numbered page of the work (p. 297). White (1853 : 22) published the name *Tachina walkeri* as a replacement name for the second use of *T. defecta* (evidently not appreciating that Walker had himself dealt with the homonymy), and *walkeri* White is therefore a synonym of *confecta* Walker.

Identity. Unknown, the name remains a *nomen dubium* as the type-material of *defecta* (2) is lost and nothing reliable can be deduced from the description.

Tachina conjuncta Walker, 1853 : 59 (No. 91). Type(s) [? sex], ENGLAND (lost)

Identity. Unknown, the name remains a *nomen dubium.* Verrall (1888 : 21) assigned *conjuncta* to *Nemoraea* Robineau-Desvoidy, but later (Verrall, 1901 : 25) listed *conjuncta* as a synonym of *Erigone strenua* (Meigen). On the basis of Verrall's (1901) placement, Bezzi (1907 : 218) listed *conjuncta* as a synonym of *Ernestia rudis* (Fallén, 1810), of which *E. strenua* (Meigen, 1824) is a synonym. It is unknown what evidence Verrall may have had for his placement of the name, but as Walker's description of *conjuncta* is at variance with the characters of *E. rudis* the synonymy given by Verrall and Bezzi is not accepted here (the size alone, in the original description, contra-indicates their synonymy).

Tachina constans Walker, 1853 : 75 (No. 129). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).

The holotype has lost both hind legs, the left fore leg and the right mid leg, and the abdomen is impaled on the pin separately from the rest of the specimen; the thorax has some mould but the bristling is well preserved. It bears a printed label '128 constans *Walk.*'.

Identity. **Syn. n.** of ***Phryxe vulgaris*** (Fallén, 1810 : 282 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♀ holotype of *constans* has been directly compared with ♀ paralectotypes of *vulgaris* as well as with the ♂ lectotype.

[*Tachina contempta* Walker, 1853. Not Tachinidae, see p. 298].

Tachina contracta Walker, 1853 : 24 (No. 13). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Bezzi (1907 : 212) listed *contracta* as a doubtful species of *Ernestia* Robineau-Desvoidy, evidently deducing this possibility from the description. There is insufficient evidence that *contracta* is an *Ernestia* to accept this placement, and in the absence of type-material the identity is impossible to determine.

Tachina crisia Walker, 1849 : 738. Holotype ♂, ENGLAND (BMNH).

The holotype is in very good condition except for loss of the right mid leg. It bears a circular green-edged type label on which Austen has written the name and sex in black ink.

Identity. **Syn. n.** of ***Eurithia anthophila*** (Robineau-Desvoidy, 1830 : 66 (*Erigone*)), syntypes ♂ ♀, FRANCE (lost). Austen (1907 : 329) placed *crisia* as a synonym of *Ernestia* (*Erigone*) *radicum* (sensu Fabricius, not Linnaeus) which is the species to which the name *anthophila* rightly applies.

Tachina defecta Walker, 1853 : 27 (No. 18). Holotype ♀, ENGLAND (UM, Oxford, ex coll. Desvignes).

The holotype is in poor condition with both mid and hind legs lost, most of left fore tarsus lost, and most of the left wing lost; the body is dirty and rather mouldy. It bears a label reading '*T. defecta* Walker's original type from Desvignes' collection' in an unrecognized handwriting.

Identity. **Syn. n.** of ***Billaea irrorata*** (Meigen, 1826 : 44 (*Dexia*)), holotype ♂, GERMANY (MNHN, Paris) [examined by Herting]. Verrall (1888 : 22) placed *defecta* as a possible species of *Dexia* Meigen.

Tachina defecta Walker, 1853 : 46 (No. 61). Type(s) [? sex], ENGLAND (lost). Primary homonym of *T. defecta* Walker (1853 : 27).

Walker (1853 : [298]) published the replacement name *Tachina confecta* (q.v.), and White (1853 : 22) published the replacement name *Tachina walkeri*, for Walker's second use of the name *T. defecta*. See under *T. confecta*, above, for a note on the identity.

Tachina delitescens Walker, 1853 : 73 (No. 123). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype has lost the left hind leg, left fore tarsus and most of the left mid tarsus, but is otherwise in good condition except for a little mould. It bears a printed label '122 delitescens *Walk*.'.

Identity. **Syn. n.** of ***Timavia amoena*** (Meigen, 1824 : 264 (*Tachina*)), syntypes ♂ ♀, GERMANY (MNHN, Paris) [examined by Herting].

Tachina demissa Walker, 1853 : 78 (No. 135). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing can be deduced about the identity from the original description or from Walker's (1853 : 18) key placement, in which he associated *demissa* with *denotans* (= *Dinera grisescens*), *contempta* (= *Sarcophaga* s.l. sp.) and *objecta* (identity unknown).

Tachina demota Walker, 1853 : 61 (No. 96). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).

The holotype has lost all left legs and the right fore tarsus, and is rather dirty with greased head, but is otherwise in fairly good condition. It has a printed label '95 demota *Walk*.'.

Identity. **Syn. n.** of ***Lydella grisescens*** Robineau-Desvoidy, 1830 : 112, type(s) [? sex], FRANCE (lost).

Tachina denotans Walker, 1853 : 77 (No. 132). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype is in good condition except for having lost both mid legs and the left third antennal segment. It has a printed label '131 denotans *Walk*.'.

Identity. **Syn. n.** of ***Dinera grisescens*** (Fallén, 1816 : 243 (*Musca*)), holotype ♂, SWEDEN (NR, Stockholm) [examined]. The ♂ holotypes of *denotans* and *grisescens* have been directly compared.

Tachina detracta Walker, 1853 : 22 (No. 8). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium* though undoubtedly applying in the Ernestiini. Walker's description and his key placement (Walker, 1853 : 15) in a group with *caesia* Fallén (No. 7) and *puparum* Fabricius ? (No. 9) undoubtedly indicate that the name *detracta* applied to a species of Ernestiini, but it is impossible to determine which of the several British species of this tribe he had before him. Bezzi (1907 : 212) listed *detracta* as a possible species of *Ernestia* Robineau-Desvoidy.

Tachina diniele Walker, 1849 : 771. Holotype ♂, ENGLAND (BMNH).

The holotype has lost the left mid leg and most of the left fore tarsus and a few setae but is otherwise in good condition. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Pales pumicata*** (Meigen, 1824 : 397 (*Tachina*)), syntypes 3 ♂ [1 misassociated] GERMANY (MNHN, Paris) [examined by Herting].

Tachina discrepans Walker, 1853 : 54 (No. 80). Holotype ♀, ENGLAND (UM, Oxford, ex coll. Desvignes).

The holotype is very dirty with mould and has lost the left mid and hind legs and the right fore leg, but the chaetotaxy is well preserved. It bears a label reading '*T. Discrepans.* Walker's original type from Desvignes' collection' in an unrecognized handwriting.

Identity. **Syn. n.** of ***Lydella grisescens*** Robineau-Desvoidy, 1830 : 112, type(s) [? sex], FRANCE (lost). Verrall (1888 : 21) incorrectly assigned *discrepans* to the genus *Masicera* Macquart, and evidently on the basis of this Bezzi (1907 : 283) included the name in his list of 'Species dubiae' of *Masicera.*

Tachina disjuncta Walker, 1853 : 44 (No. 58). Type(s) [? sex], ENGLAND (lost). Junior primary homonym of *Tachina disiuncta* Wiedemann, 1824.

Identity. Unknown, the name remains a *nomen dubium.* Bezzi (1907 : 336) placed *disjuncta* as a synonym of *Exorista larvarum* (Linnaeus) but there appears to be no evidence in support of this placement; Bezzi cited no reference for the name other than the original, and Verrall's (1888; 1901) lists had simply recorded *disjuncta* under *Tachina* without suggesting any synonymy. It is not known why Bezzi placed *disjuncta* in synonymy with *larvarum,* especially as there is nothing in the description which specially supports such placement.

Walker's *disjuncta* is here considered to be a junior primary homonym of *Tachina disjuncta* Wiedemann, although the original spelling of the latter specific name was *disiuncta.* The '*i*' and '*j*' difference is not one of the variable spelling situations covered by *Code* Article 58, but clearly should be under the spirit if not the letter of this Article.

Tachina dispartita Walker, 1853 : 23 (No. 10). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the original description or from Walker's (1853 : 15) key placement in which he associated *dispartita* with *bijuncta* (No. 12) and *intracta* (No. 11); types of these are also lost. Bezzi (1907 : 212) listed *dispartita* as possibly a species of *Ernestia* Robineau-Desvoidy, which could be correct, but there is nothing to substantiate it.

Tachina dispecta Walker, 1853 : 60 (No. 94). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Verrall (1888 : 21) assigned *dispecta* to the genus *Nemoraea* Robineau-Desvoidy, but later placed the name as a synonym of *Winthemia quadripustulata* (Fabricius, 1794) (cited by Verrall as *Chaetolyga quadripustulata*). Bezzi (1907 : 231) accepted Verrall's (1901) synonymy. No evidence is available that Verrall actually saw type-specimens, and his 1901 placement seems to be a guess from the original description (perhaps largely based on Walker's description of the abdomen as 'obconico tessellato, apice rufo'). Though the description of the abdomen fits *quadripustulata* there are other parts of the description (such as 'palpi black', emphasised by Walker in italics) that contra-indicate this species. Evidence that *dispecta* was a *Winthemia* Robineau-Desvoidy is inconclusive and the name is best left standing as a *nomen dubium.* The species was described from Desvignes's collection.

Tachina dispuncta Walker, 1853 : 57 (No. 87). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the original description or from Walker's (1853 : 17) key placement.

Tachina distenta Walker, 1853 : 55 (No. 82). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the original description or from Walker's (1853 : 17) key placement, in which he associated *distenta* (No. 82) with *comitata* (No. 83); the type-material of the latter is also lost. The species was described from Stephens's collection.

Tachina distermina Walker, 1853 : 61 (No. 95). Holotype ♀, ENGLAND (BMNH, ex coll. Stephens).

The holotype is in good condition except that the left arista and the left mid leg from the middle of the tibia are lost, and the ptilinum extruded. It bears a printed label '94 distermina *Walk.*'.

Identity. **Syn. n.** of ***Phryxe vulgaris*** (Fallén, 1810 : 282 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♀ holotype of *distermina* has been directly compared with ♀ paralectotypes of *vulgaris* as well as with the ♂ lectotype.

Tachina divulsa Walker, 1853 : 45 (No. 59). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the original description or from Walker's (1853: 16) key placement. The species was described from Desvignes's collection.

Tachina domator Walker, 1853 : 62 (No. 97). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the original description or from Walker's (1853 : 17) key placement, in which he associated *divulsa* with some other nominal species known to belong in Eryciini. The species was described from Desvignes's collection.

Tachina effecta Walker, 1853 : 51 (No. 74). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement.

Tachina emissa Walker, 1853 : 49 (No. 68). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement, in which he associated *emissa* with three other nominal species, one of which (No. 70) is now known to be an *Exorista* Meigen. The species was described from Desvignes's collection.

Tachina enodata Walker, 1853 : 57 (No. 86). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement, in which he associated *enodata* with *fulgens* Meigen. The latter is now known to be a synonym of *Linnaemya comta* (Fallén). It is of interest to note that in the genus *Linnaemya* Robineau-Desvoidy the palpi are vestigial and that Walker, contrary to his usual practice, did not mention the palpi in the description of *enodata*; it is certainly possible that *enodata* was described from a specimen of *Linnaemya*, but in the absence of adequate confirmation the name *enodata* must remain a *nomen dubium.*

Tachina enotata Walker, 1853 : 48 (No. 67). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement, in which he grouped *enotata* (No. 67) with *interclusa* (No. 66); the type-material of the latter is also lost.

Tachina erecta Walker, 1853 : 76 (No. 131). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 18) key placement. The species was described from Stephens's collection.

Tachina erogata Walker, 1853 : 54 (No. 79). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement, in which he associated *erogata* (No. 79) with *immissa* (No. 77) (= *Lydella grisescens*) and *involuta* (No. 78) (identity unknown).

Tachina evidens Walker, 1853 : 42 (No. 54). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement, in which he associated *evidens* (No. 54) with *intacta* (No. 55), of which the type-material is also lost.

Tachina evocata Walker, 1853 : 38 (No. 43). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement. Bezzi (1907 : 283) listed *evocata* in his 'Species dubiae' of *Masicera* Macquart, evidently having taken this from Verrall's (1888, pt. 2: 4) tentative placement of *evocata* as a *Masicera* species.

Tachina evoluta Walker, 1853 : 40 (No. 48). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement.

Tachina exacta Walker, 1853 : 41 (No. 50). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium*. Verrall (1888 : 21) assigned *exacta* to the genus *Nemoraea* Robineau-Desvoidy, but later placed the name as a synonym of *Timavia amoena* (Meigen, 1824) (cited by Verrall as *Chaetolyga amoena*). Bezzi (1907 : 229) accepted Verrall's synonymy. No evidence is available that Verrall actually saw type-specimens of *exacta*, and discrepancies between its description and the characters of *amoena* make it unlikely that Walker's nominal species is truly synonymous with Meigen's. The name *exacta* is therefore not accepted as a synonym of *amoena*, and remains a *nomen dubium*.

Tachina exagens Walker, 1853 : 60 (No. 93). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement, in which he associated *exagens* (as No. 93) with several other numbered species; the associated species, where the identities are known, belong in the Eryciini and it is probable that *exagens* was an Eryciine. The species was described from Desvignes's collection.

Tachina excessa Walker, 1853 : 65 (No. 105). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).
The holotype is in good condition except that it has lost the right hind leg and the left third antennal segment, and carries some fungal threads. It bears a printed label '104 excessa *Walk*.'.
Identity. **Syn. n.** of ***Dufouria nigrita*** (Fallén, 1810 : 286 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♀ holotype of *excessa* has been directly compared with the ♀ paralectotypes of *nigrita* as well as with the ♂ lectotype.

Tachina exclusa Walker, 1853 : [298]. Replacement name for *Tachina interclusa* Walker, 1853 : 48, primary homonym of *Tachina interclusa* Walker, 1853 : 32.
Walker (1853) described two different species with the name *Tachina interclusa*, but published the replacement name *T. exclusa* for the second use of the name *interclusa* in a table of 'Errata' on an unnumbered page immediately following the last numbered page of the work (p. 297).
Identity. Unknown, the name remains a *nomen dubium* as the type-material of *interclusa* (2) is lost and nothing reliable can be deduced from the description or key placement.

[*Tachina expetita* Walker, 1853. Not Tachinidae, see p. 298].

Tachina expleta Walker, 1853 : 55 (No. 81). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement, in which he did not associate *expleta* with other species.

Tachina exscensa Walker, 1853 : 66 (No. 108). Holotype ♀, ENGLAND (BMNH, ex coll. Stephens).
The holotype is in good condition except for the loss of the left fore and mid legs. It bears a printed label '107 exscensa *Walk*.'.
Identity. **Syn. n.** of ***Actia pilipennis*** (Fallén, 1810 : 273 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♀ holotype of *exscensa*

has been directly compared with the ♀ paralectotypes of *pilipennis* as well as with the ♂ lectotype.

[*Tachina exsecta* Walker, 1853. Not Tachinidae, see p. 298].

Tachina fissa Walker, 1853 : 51 (No. 72). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement, in which *fissa* was not grouped with other species.

Tachina flexa Walker, 1853 : 58 (No. 89). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement, in which *flexa* was not grouped with other species. Verrall (1888 : 21) listed flexa in the genus *Exorista* Meigen, but later (Verrall, 1901 : 43) listed the name in its original combination, as did Bezzi (1907 : 351). Verrall's sense of *Exorista* included species that would now be placed in many genera in different tribes, and there is no evidence that *flexa* belonged to *Exorista* Meigen in its true sense. *T. flexa* was described from Desvignes's collection.

Tachina immissa Walker, 1853 : 53 (No. 77). Holotype ♀, ENGLAND (UM, Oxford, ex coll. Desvignes).
The holotype is mouldy and has lost the left hind leg, the right mid leg and parts of the remaining tarsi. It bears a label reading '*T. Immissa*. Walker's original type from Desvignes' collection' in an unrecognized handwriting.
Identity. **Syn. n.** of ***Lydella grisescens*** Robineau-Desvoidy, 1830 : 112 type(s) [? sex], FRANCE (lost). Verrall (1888 : 21) wrongly placed *immissa* in the genus *Masicera* Macquart, and this was doubtless the basis for Bezzi's (1907 : 283) inclusion of the name in his list of *Masicera* 'Species dubiae'.

Tachina infensans Walker, 1853 : 88 (No. 157). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).
The holotype is in very good condition except for loss of the left mid leg and some distortion of the lower head and ptilinum. It bears a printed label '156 infensans *Walk.*'.
Identity. **Syn. n.** of ***Pales pavida*** (Meigen, 1824 : 398 (*Tachina*)). Syntype ♂, GERMANY (MNHN, Paris) [examined by Herting].
Meigen described *pavida* from both sexes but only a single type-specimen (a male) exists in Meigen's collection in Paris. At present this specimen has the status of syntype.

Tachina infestans Walker, 1853 : 91 (No. 163). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 19) key placement.

Tachina infixa Walker, 1853 : 70 (No. 116). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).
The holotype has lost the right mid and hind legs and the apex of the left hind tarsus but is otherwise in good condition (except for slight crushing of the left side of the head).
Identity. **Syn. n.** of ***Zaira cinerea*** (Fallén, 1810 : 268 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♂ holotype of *infixa* and the ♂ lectotype of *cinerea* have been directly compared.

Tachina inoperta Walker, 1853 : 86 (No. 152). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 19) key placement.

Tachina inquilina Walker, 1853 : 87 (No. 154). Type(s) [? sex], ENGLAND (lost).
Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 19) key placement. The species was described from Stephens's collection, but no specimen named as *inquilina* could be found in the Stephens material.

Tachina insedata Walker, 1853 : 87 (No. 155). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 19) key placement.

Tachina insuscepta Walker, 1853 : 50 (No. 70). Holotype ♀, ENGLAND (UM, Oxford, ex coll. Desvignes).

The holotype is in bad condition, being very mouldy and having lost the antennae, both fore legs, and the apices of the right mid and hind legs.

Identity. **Syn. n.** of ***Exorista larvarum*** (Linnaeus, 1758 : 596 (*Musca*)) sensu authors. Verrall (1888 : 21) wrongly placed *insuscepta* in the genus *Phorocera* Robineau-Desvoidy, and this accounts for Bezzi's (1907 : 319) placement of the name in his list of *Phorocera* 'Species dubiae'.

Tachina intacta Walker, 1853 : 43 (No. 55). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement, in which he associated *intacta* with *evidens* Walker (No. 54, type also lost).

Tachina intaminata Walker, 1853 : 48 (No. 65). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description, or from Walker's (1853 : 16) key placement, in which he associated *intaminata* with ? *cincta* Meigen. The very small size given by Walker (length 1½ lines) suggests that *intaminata* may not be a Tachinid. The species was described from Stephens's collection.

Tachina intercedens Walker, 1853 : 31 (No. 28). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 15) key placement. The species was described from Stephens's collection.

[*Tachina intercepta* Walker, 1853. Not Tachinidae, see p. 298].

Tachina interclusa Walker, 1853 : 32 (No. 30). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 15) key placement. The very small size given by Walker (length 1½ lines) suggests that *interclusa* may not be a Tachinid.

Tachina interclusa Walker, 1853 : 48 (No. 66). Type(s) [? sex], ENGLAND (lost). Primary homonym of *T. interclusa* Walker (1853 : 32).

Walker (1853 : [298]) published the replacement name *Tachina exclusa* (q.v.) for his second use of the name *T. interclusa.* See under *T. exclusa*, above, for a note on the identity.

[*Tachina interlapsa* Walker, 1853. Not Tachinidae, see p. 299].

[*Tachina interlatens* Walker, 1853. Not Tachinidae, see p. 299].

Tachina intermixta Walker, 1853 : 39 (No. 45). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Verrall (1888 : 21) placed *intermixta* as a species of *Exorista* Meigen, listing the name as valid, but later (Verrall, 1901 : 23) treated *intermixta* as a synonym of *notabilis* Meigen, 1824. Bezzi (1907 : 257, 259) repeated the synonymy established by Verrall. Meigen's *notabilis* is considered to be a synonym of *Nemorilla floralis* (Fallén, 1810), a winthemiine Tachinid with hairy eyes, but Walker (1853 : 16) placed *intermixta* (as No. 45) in a section of his key in which the species had bare eyes and associated it with *nana* Walker (No. 46) which is a Rhinophorid. It is impossible to deduce anything reliable from the description as to the true identity of *intermixta,* which was described from Desvignes's collection, and there is no evidence that Verrall saw any type-specimen; these facts, together with the conflict between Walker's 'bare eyes' and the hairy eyes of *notabilis* = *floralis,* make Verrall's synonymy unacceptable and the name *intermixta* must revert to *nomen dubium* status.

Tachina interna Walker, 1853 : 69 (No. 115). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Verrall (1888 : 21) listed *interna* as a species of *Exorista* Meigen, and this was the basis for Bezzi's (1907 : 251) placement of the name in his list of *Exorista* 'Species dubiae'. Verrall's concept of *Exorista* was very different from the modern conception of this genus, and since nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement and there is no evidence that Verrall saw type-specimens the name *interna* must be considered a *nomen dubium.* The species was described from Desvignes's collection.

Tachina internexa Walker, 1853 : 62 (No. 98). Type(s) [? sex], [ENGLAND, presumed, as letter 'E.' omitted from description] (lost).

Identity. Junior synonym of ***Pales pavida*** (Meigen, 1824 : 398 (*Tachina*)), syntype ♂, GERMANY (MNHN, Paris) [examined by Herting]. The synonymy of *internexa* was first established by Verrall (1901 : 24), who placed the name as a synonym of *Phorocera cilipeda* Rondani, 1859; but *cilipeda* is a synonym of *pavida* Meigen, and Bezzi (1907 : 311, 312) therefore treated *internexa* as a synonym of *pavida.* Although the type-material of *internexa* from Desvignes's collection is lost the synonymy established by Verrall and Bezzi is considered correct; the description contains nothing that would contra-indicate it.

Tachina intersecta Walker, 1853 : 38 (No. 42). LECTOTYPE ♂, by present designation, ENGLAND (BMNH, ex coll. Desvignes).

Paralectotype: ♂ ENGLAND (UM, Oxford, ex coll. Desvignes).

The lectotype is in very good condition except for the loss of the right fore leg. The paralectotype is in very bad condition and consists only of the head and anterior half of the thorax, the right fore leg and left mid leg and the left wing, and what remains is badly obscured by mould. Lectotype and paralectotype are each labelled '*T. Intersecta* Walker's original type from Desvignes' collection' in an unrecognized handwriting.

Identity. **Syn. n.** of ***Lypha dubia*** (Fallén, 1810 : 284 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♂ lectotypes of *intersecta* and *dubia* have been directly compared. The female of this species was described by Walker (1853) as *T. commissa,* q.v. The spelling *intersceta* in Bezzi (1907 : 283) is an incorrect subsequent spelling.

[*Tachina intersecta* Walker, 1853 (second use of name). Not Tachinidae, see p. 299].

Tachina intersita Walker, 1853 : 72 (No. 121). Holotype ♀, ENGLAND (UM, Oxford, ex coll. Desvignes).

The holotype is in extremely bad condition and consists only of the head, thorax and base of left wing, all of which are very dirty. It bears a label reading '*T. Intersita.* Walker's original type from Desvignes' collection' in an unrecognized handwriting.

Identity. Junior synonym of ***Nemorilla floralis*** (Fallén, 1810 : 287 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. Verrall (1901 : 23) established the synonymy of *intersita* with *notabilis* Meigen, 1824, and Bezzi (1907 : 259) also cited the name in synonymy with *Nemorilla notabilis.* The latter specific name is a synonym of *floralis* Fallén and *intersita* is therefore a junior synonym of *floralis.* The holotype remains of *intersita* have been directly compared with the ♀ paralectotype of *floralis* as well as with the ♂ lectotype.

Tachina intracta Walker, 1853 : 23 (No. 11). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Bezzi (1907 : 212) listed *intracta* as a possible species of *Ernestia* Robineau-Desvoidy, and it seems probable from the description and Walker's (1853 : 15) key placement that the nominal species did belong in Ernestiini. No definite identification is, however, possible. The species was described from Stephens's collection.

Tachina involuta Walker, 1853 : 53 (No. 78). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 17) key placement, in which he associated *involuta* with *immissa* (= *Lydella grisescens*) and *erogata* (identity unknown).

Tachina medoacus Walker, 1849 : 746. Holotype ♀, ENGLAND (BMNH).

The holotype has lost the left fore leg and both third antennal segments, but is otherwise in fair condition except for rubbing off of the frontal and dorsal thoracic setae. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *medoacus* with *rustica* was first established by Austen (1907 : 329) and is here confirmed.

Tachina megaleas Walker, 1849 : 739. Holotype ♂, ENGLAND (BMNH).

The holotype is in good condition except for loss of the right fore leg, the left fore tarsus and the apex of the left mid tarsus, and slight damage to the scutum. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, SWEDEN NR, (Stockholm) [examined and herein designated]. The synonymy of *megaleas* with *rustica* was first established by Austen (1907 : 329) and is here confirmed after direct comparison of the ♂ primary types and examination of the genitalia.

Tachina menestho Walker, 1849 : 783. Holotype ♀, ENGLAND (BMNH).

The holotype is a greasy teneral specimen, and has lost the left mid leg, the left hind tibia and tarsus, the right antenna and the left arista, but the bristling is mostly still in place. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Phorocera obscura*** (Fallén, 1810 : 283 (*Tachina*)), lectotype ♂ (by designation of van Emden, 1954 : 73, footnote), SWEDEN (UZI, Lund) [examined by van Emden]. It may usefully be noted here that the paralectotypes of *Phorocera assimilis* (Fallén) are actually specimens of *P. obscura* (Fallén) and that the holotype of *menestho* has been directly compared with them.

[*Tachina mera* Walker, 1853. Not Tachinidae, see p. 299].

Tachina mesula Walker, 1849 : 737. Holotype ♂, ENGLAND (BMNH).

The holotype is in fairly good condition, but has lost the fore tarsi, the right mid tarsus and the antennae, and the wings are slightly frayed. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Demoticus plebejus*** (Fallén, 1810 : 269 (*Tachina plebeja*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *mesula* with *plebejus* was first established by Austen (1907 : 328) and is here confirmed after direct comparison of the ♂ primary types.

Tachina motor Walker, 1853 : 71 (No. 118). Holotype ♂, ENGLAND (BMNH, ex coll. Stephens).

The holotype is in excellent condition except that the mesonotum is crushed in. It bears a printed label '117 motor *Walk.*'.

Identity. **Syn. n.** of ***Lydina aenea*** (Meigen, 1824 : 273 (*Tachina*)), syntype ♀, ? FRANCE or GERMANY (MNHN, Paris) [examined by Herting].

Meigen described *aenea* from both sexes and from specimens collected by himself (presumably in Germany) and by Baumhauer in Provence. The single ♀ specimen in Meigen's collection in Paris has syntype status at present; it is probably from Germany but this is not known positively.

Tachina multans Walker, 1853 : 82 (No. 143). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium.* Nothing reliable can be deduced from the description or from Walker's (1853 : 18) key placement, in which he associated *multans* with *Phorocera assimilis* (Fallén) (No. 144) and with *munita* (No. 145) (which also = *assimilis*, see next entry).

Tachina munita Walker, 1853 : 82 (No. 145). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype is in good condition except for loss of the left mid leg and apex of the right mid tarsus, and for crushing of the eyes. It bears a printed label '144 munita *Walk.*'.

Identity. **Syn. n.** of ***Phorocera assimilis*** (Fallén, 1810 : 283 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♂ holotype of ***munita*** and the ♂ lectotype of *assimilis* have been directly compared.

[*Tachina nana* Walker, 1853. Not Tachinidae, see p. 300].

Tachina neglecta Walker, 1853 : 25 (No. 15). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 15) key placement, though it appears probable that *neglecta* was an Ernestiine; Bezzi (1907 : 213) listed it as a possible *Ernestia* species.

Tachina neglecta Walker, 1853 : 79 (No. 138). Holotype ♀, ENGLAND (BMNH, ex coll. Walker). Primary homonym of *T. neglecta* Walker (1853 : 25), see *T. collecta* Walker (replacement name).

The holotype has lost both fore legs and the right mid leg but is otherwise in good condition except for loss of some scutellar and abdominal setae. It bears a printed label '137 neglecta *Walk.*'.

Identity. See entry for *Tachina collecta*. *T. neglecta* (2) enters into new synonymy with ***Phryxe vulgaris*** (Fallén).

[*Tachina nexa* Walker, 1853. Not Tachinidae, see p. 300].

Tachina nigrolineata Walker, 1853 : 85 (No. 150) (validation of *T. nigrolineata* Stephens, 1829*a*, *b*, *nomen nudum*). Holotype ♀, ENGLAND (BMNH, ex coll. Stephens).

The holotype has lost all the legs except the right hind leg (of which the tarsal apex is missing) and has the lower part of the head distorted and the upper ptilinum extruded, but is otherwise in good condition; the bristling of head, thorax and abdomen is all excellently preserved. It bears a printed label 'nigrolineata *mihi*'.

Identity. Valid senior synonym for *Pseudoperichaeta insidiosa* (Robineau-Desvoidy), new combination ***Pseudoperichaeta nigrolineata*** (Walker) **comb. n.** here established. *P. insidiosa* (Robineau-Desvoidy, 1863 : 338 (*Phryxe*)), holotype ♀, FRANCE (MNHN, Paris), here established as a junior synonym (**Syn. n.**) of *P. nigrolineata* (Walker, 1853).

Bezzi (1907 : 337) placed *nigrolineata* as a synonym of *Tachina* (now *Exorista*) *larvarum* (L.), an inexplicably erroneous placement.

Tachina nymphidius Walker, 1849 : 751. Holotype ♀, ENGLAND (BMNH).

The holotype is in very good condition except for loss of the left fore tarsus, most of the right tarsi and both aristae. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *nymphidius* with *rustica* was first established by Austen (1907 : 329) and is here confirmed after comparison of types.

Tachina objecta Walker, 1853 : 78 (No. 134). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 18) key placement. The species was described from Stephens's collection.

Tachina olizon Walker, 1849 : 753. Holotype ♀, England (BMNH).

The holotype is in good condition except for loss of the right hind leg and some rubbing of the frontal, mesonotal and abdominal vestiture. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Macquartia praefica*** (Meigen, 1824 : 271 (*Tachina*)), holotype or syntype ♀, Germany (MNHN, Paris) [examined by Herting].

Meigen described only the female of *praefica* but his collection in Paris contains a male and a female specimen. As Meigen (unlike Walker!) was good at sexing Tachinidae it is possible that the male specimen in not an original syntype. The exact type-status of the two specimens is not considered further at present.

Tachina orbilius Walker, 1849 : 736. Holotype ♀, England (BMNH).

The holotype has lost both mid legs, the right hind leg, most of the left hind tarsus and the left third antennal segment, but apart from some fraying of the wings is otherwise in good condition. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Macquartia viridana*** Robineau-Desvoidy, 1863 : 1104, syntypes ♂♀, France (lost) = *Macquartia flavipes* sensu authors, not Meigen, 1824 (misidentification). Austen (1907 : 328) synonymized *orbilius* with *flavipes*, but it is now considered that *flavipes* sensu Austen and other authors (such as van Emden, 1954 : 37) is a misidentification. Bezzi (1907 : 209) wrongly placed *orbilius* as a possible synonym of *Micropalpus vulpinus* (Fallén).

Tachina pamesos Walker, 1849 : 744. Holotype ♀, England (BMNH).

The holotype is in very good condition except for loss of the left mid leg, right mid tarsus, and the apices of other tarsi. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of *Exorista* (*Adenia*) *rustica* (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, Sweden (NR, Stockholm) [examined and herein designated]. The synonymy of *pamesos* with *rustica* was first established by Austen (1907 : 329) and is here confirmed after comparison of types.

Tachina particeps Walker, 1853 : 41 (No. 49). Type(s) [? sex], England (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement.

Tachina perpingens Walker, 1853 : 67 (No. 110). Holotype ♀, England (BMNH, ex coll. Walker).

The holotype is in very good condition, but the large pin obscures much of the scutum. It bears a printed label '109 perpingens *Walk.*'.

Identity. **Syn. n.** of ***Elfia cingulata*** (Robineau-Desvoidy, 1830 : 86 (*Actia*)), holotype [? sex], France (lost).

Tachina pertinens Walker, 1853 : 43 (No. 56). Type(s) [? sex], England (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key, in which the species was grouped alone. The description indicates that the arista was thickened for its whole length and the costal spine strong, but these clues are not sufficiently strong to be sure of the identity. The species was described from Stephens's collection.

[***Tachina pertracta*** Walker, 1853. Not Tachinidae, see p. 300].

Tachina philonis Walker, 1849 : 751. Holotype ♀, England (BMNH).

The holotype is in very good condition except for the loss of the right fore leg and some setae of the dorsum.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, Sweden (NR, Stockholm) [examined and herein designated]. The synonymy of *philonis* with *rustica* was first established by Austen (1907 : 329) and is here confirmed after examination of types.

Tachina pitho Walker, 1849 : 740. Holotype ♂, ENGLAND (BMNH).

The holotype is in good condition except for loss of the fore tibiae and tarsi and some mesonotal setae. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *pitho* with *rustica* was first established by Austen (1907 : 329) and is here confirmed after direct comparison of the ♂ primary types and examination of the genitalia.

Tachina quadricincta Walker, 1853 : 84 (No. 148) (validation of *T. quadricincta* Stephens, 1829*a*, *b*, *nomen nudum*). Holotype ♀, ENGLAND (BMNH, ex coll. Stephens).

The holotype has lost both fore legs, the left hind leg and the apex of the right mid leg, but is otherwise well preserved; the chaetotaxy is in excellent condition. It bears a printed label 'quadricincta *mihi*'.

Identity. **Syn. n.** of ***Phryxe nemea*** (Meigen, 1824 : 340 (*Tachina*)), syntypes 2 ♀, EUROPE [country uncertain] (NM, Vienna) [examined by Herting].

Tachina reclusa Walker, 1853 : 32 (No. 29). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 15) key placement.

Tachina refecta Walker, 1853 : 50 (No. 71). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 16) key placement.

Tachina reformata Walker, 1853 : 63 (No. 99). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).

The holotype has lost both mid legs, the left hind leg and some scuteller setae, but is otherwise in good condition except for some mould. It bears a printed label '98 reformata *Walk.*'.

Identity. **Syn. n.** of ***Lydina aenea*** (Meigen, 1824 : 273 (*Tachina*)), syntype ♀, ? FRANCE or GERMANY (MNHN, Paris) [examined by Herting]. See under *T. **motor*** Walker, above, for a further note on the provenance and status of *aenea* type-material.

Tachina rejecta Walker, 1853 : 79 (No. 137). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype is in poor condition, having lost the head, both fore legs, the right mid tibia and tarsus and the scutellar setae, and having a hole in the scutum. It bears a printed label '136 rejecta *Walk.*'.

Identity. **Syn. n.** of ***Periscepsia spathulata*** (Fallén, 1820 : 7 (*Tachina*)), holotype ♂ [not ♀], SWEDEN (UZI, Lund).

This species has been known in Britain as *Wagneria lentis* (Meigen, 1824) (van Emden, 1954 : 40), but *lentis* is now considered to be a synonym of *spathulata* (see Herting, 1972 : 9). There are no type-specimens of *spathulata* in Fallén's collection in Stockholm, and the holotype is actually now in Zetterstedt's collection at Lund: the type-locality is Abusa, a small village about 13 km east of Lund in Hällestad parish, and the holotype bears Zetterstedt's label 'T. spathulata ♂ Abusa Mus. Fall.' (Zetterstedt correctly gives the sex as ♂, Fallén's statement of ♀ in the original description being in error.). Standing in Zetterstedt's collection with the holotype is a second specimen labelled 'T. Spathulata ♀ a Gyll.' but this is not an original specimen from Fallén's collection and has no type-status.

Tachina retracta Walker, 1853 : 80 (No. 139). Holotype ♂, ENGLAND (UM, Oxford, ex coll. Desvignes).

The holotype is in poor condition; the body and wings are very dirty, the thorax and head rather greased, the right fore leg and left fore tarsus are lost and the left arista is lost.

Identity. **Syn. n.** of ***Lydella grisescens*** Robineau-Desvoidy, 1830 : 112, type(s) [? sex], FRANCE (lost). Verrall (1888 : 21) wrongly placed *retracta* in the genus *Masicera* Macquart, and this was doubtless the basis for Bezzi's (1907 : 284) inclusion of the name in his list of *Masicera* 'Species dubiae'.

Tachina reventa Walker, 1853 : 70 (No. 117). Holotype ♀ [not ♂], ENGLAND (BMNH, ex coll. Walker).

Walker stated '*Male.*' at the start of the English description and continued 'Frontalia widening much in front' (which suggests a male specimen), but only one specimen stood under the name *reventa* in Walker's collection, and this is female. Walker was notoriously unable to sex Tachinids correctly and despite the discrepancy with the description it is here considered that the existing female specimen must be the holotype; all features in the description other than those alluded to fit the specimen very exactly. It is of interest to note that the citation of a sex in the *reventa* description is the only instance in which Walker mentioned a sex in any of his British Tachinid descriptions.

The holotype is in fair condition; the head is only weakly attached, the mouthparts partially eaten away, both fore legs and the right third antennal segment are lost, and the vibrissae and frontal setae are rubbed off. It bears a printed label '116 reventa *Walk.*'.

Identity. **Syn. n.** of ***Dufouria chalybeata*** (Meigen, 1824 : 271 (*Tachina*)), syntypes 1 ♂, 1 ♀, GERMANY (MNHN, Paris) [examined by Herting].

[***Tachina senta*** Walker, 1853. Not Tachinidae, see p. 300].

[***Tachina separata*** Walker, 1853. Not Tachinidae, see p. 300].

Tachina telestho Walker, 1849 : 747. Holotype ♀, ENGLAND (BMNH).

The holotype has the head and thorax greased, the wings frayed, and the mid tarsi lost or damaged, but is otherwise in fairly good condition (apart from a few lost setae). It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810 : 264 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of *telestho* with *rustica* was first established by Austen (1907 : 329) and is here confirmed after examination of types.

Tachina titormus Walker, 1849 : 755. Holotype ♀, ENGLAND (BMNH).

The holotype is in good condition except for loss of the right hind leg and right third antennal segment and some disarrangement of the setae. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. **Syn. n.** of ***Macquartia dispar*** (Fallén, 1820 : 31 (*Tachina*)), lectotype ♀, SWEDEN (NR, Stockholm) [examined and herein designated]. The ♀ primary types of *titormus* and *dispar* have been directly compared.

Tachina torta Walker, 1853 : 64 (No. 104). Holotype ♀, ENGLAND (BMNH, ex coll. Walker).

The holotype has lost the apical half of the left wing and the left mid leg, but is otherwise in good condition except for a few fungal threads. It bears a printed label '103 torta *Walk.*'.

Identity. **Syn. n.** of ***Macquartia praefica*** (Meigen, 1824 : 271 (*Tachina*)), holotype or syntype ♀, GERMANY (MNHN, Paris) [examined by Herting].

For a note on the status of the type-specimen of *praefica* in Meigen's collection in Paris see *T. olizon* Walker, above.

Tachina tyche Walker, 1849 : 738. Holotype ♂, ENGLAND (BMNH).

The holotype has lost the left third antennal segment, the apices of the fore tarsi, the right hind tarsus, and some setae but (apart from a break in the basal abdominal tergites) is otherwise in good condition. The genitalia are slide-mounted. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synonym of ***Phryxe vulgaris*** (Fallén, 1810 : 282 (*Tachina*)), lectotype ♂, SWEDEN (NR, Stockholm) [examined and herein designated]. The synonymy of ***tyche*** with *vulgaris* was first established by Austen (1907 : 329) and is here confirmed after direct comparison of the ♂ primary types, and examination of the genitalia of ***tyche***.

Tachina viridulans Walker, 1853 : 29 (No. 23). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium*. Nothing reliable can be deduced from the description or from Walker's (1853 : 15) key placement in which ***viridulans*** was grouped alone. Bezzi (1907 : 408) listed *viridulans* as a valid species of *Macquartia* Robineau-Desvoidy, which could possibly be correct; however, no evidence has been found from which Bezzi could possibly have known for certain that this placement was correct, and in the absence of reliable evidence the name is here regarded as a *nomen dubium*.

WALKER'S NAMES FOR TACHINIDAE OF UNCERTAIN ORIGIN BUT PROBABLY BRITISH

Walker (1849) described many nominal species of Tachinidae that stood in the BMNH collection without locality data. The types of almost all of these still exist, and it is therefore possible to determine the identities even though the exact provenance is unknown. Some of these nominal species are based upon types that are specimens of well known Palaearctic species, and three of these types could be British (since they belong to species that occur in Britain as well as in continental Europe). All three names are junior synonyms, but it is appropriate to record them here because of the possibility that the type-specimens were collected in Britain. The nominal species concerned are as follows.

Dexia aurinia Walker, 1849 : 847. Holotype ♀, [PALAEARCTIC REGION, probably BRITAIN] (BMNH, ex coll. Children).

The holotype has lost both hind legs, the left fore leg, the apices of the remaining tarsi and both third antennal segments; otherwise it is in fair condition except for some damage to the mesonotum. It bears a circular green-edged type label on which Austen has written the name in black ink, and a pencilled label in Austen's writing which reads 'Locality unknown Ex coll. Children. 40.3.30.266.'. Children's collection was comprised mainly of British insects, and a British provenance for ***aurinia*** is extremely probable.

Identity. Junior synonym of ***Dexia vacua*** (Fallén, 1816). The synonymy of ***aurinia*** with *vacua* was first established by Austen (1907 : 343) and is here confirmed.

Tachina pagasus Walker, 1849 : 750. Holotype ♀, [PALAEARCTIC REGION, possibly BRITAIN] (BMNH).

The holotype is in fair condition, but the head and thorax are greasy, the left fore leg lost, left mid tarsus and apices of right tarsi lost, and the left arista lost. It bears a circular green-edged label on which Austen has written the name in black ink, and a pencilled label in Austen's writing which reads 'Locality unknown.'.

Identity. Junior synonym of ***Exorista (Adenia) rustica*** (Fallén, 1810). The synonymy of *pagasus* with ***rustica*** was first established by Austen (1907 : 338) and is here confirmed.

Tachina thyamis Walker, 1849 : 771. Holotype ♂, [PALAEARCTIC REGION, probably BRITAIN] (BMNH, ex coll. Children).

The holotype has lost all legs except the right mid leg, and has lost the vibrissae, some scutal setae, the scutellar setae and some abdominal vestiture. It bears a circular green-edged type label on which Austen has written the name in black ink, and a pencilled label in Austen's writing which reads 'Locality unknown. Ex coll. Children. 40.4.3.770.'. Children's collection was comprised mainly of British insects, and a British provenance for *thyamis* is extremely probable. It should be noted that Walker (1849) also described a *Tachina thyamis* on p. 756 of the same work: the two descriptions differ but are very similar, and it seems possible that Walker made two descriptions of the same specimen; no type has been seen for the p. 756 use of the name (though Austen, 1907 : 338, reported seeing a specimen that did not fit the description), and it is not clear whether the p. 756 and p. 771 uses of the name *thyamis* are primary homonyms or whether they are simply different descriptions of the same thing. As *thyamis* p. 771 is a junior synonym anyway it is of no practical consequence in nomenclature whether homonymy exists or not.

Identity. Junior synonym of ***Pelatachina tibialis*** (Fallén, 1810). The synonymy of *thyamis* (p. 771) with *tibialis* was first established by Austen (1907 : 338) and is here confirmed.

STEPHENS'S NAMES IN THE BRITISH TACHINIDAE

Stephens (1829*a*; 1829*b*), in his *Systematic Catalogue* and his *Nomenclature* of British insects, published several new names for Tachinidae that had not previously appeared in print. One of these names was proposed for a new genus (viz. *Triarthria* Stephens) and is discussed elsewhere (see p. 295), and the others were specific names that Stephens intended to apply to species considered by him to be valid or that he listed simply as synonyms of other names. The newly proposed names in both *Catalogue* and *Nomenclature* are nearly always appended with the Latin tag '*mihi*', and it had been Stephens's intention to describe the new species for which these names stood in his *Illustrations of British Entomology:* in the event, however, descriptions were never published of any of the Tachinid species for which Stephens proposed the names, nor I believe for any of the Diptera for which Stephens (*op. cit.*) provided '*mihi*' names. Such specific names are *nomina nuda*, although some of them were validated by later authors (for example, some of Stephens's specific names were used by Walker and validated by him with descriptions).

The list that follows includes all the names proposed by Stephens for British Tachinidae (excluding the one generic name), and indicates the status of each name and the serial numbering of the name as given in Stephens (1829*b*). The identities of the various species to which Stephens intended the names to apply have – with few exceptions – been determined by reference to the specimens standing above the names in Stephens's collection. These specimens have now been removed from Stephens's collection and, after appropriate labelling, have been placed in the British Diptera collection of the BMNH. Each such specimen has been labelled in my handwriting, as in the following example: 'Tachina plumbea/Stephens nom. nud./ex coll. Stephens/BRITAIN'.

Stephens intended that most of the species for which he proposed the '*mihi*' names should be placed in a new genus distinct from *Tachina* Meigen, but he never actually described this genus. He referred to it in the *Nomenclature* (p. 59) as 'N.G. – (Tachina, p. Fall.)', meaning part of *Tachina* in Fallén's sense, and in the *Catalogue* (p. 298) as 'Genus 150 : (1274).—', meaning the 150th genus of British Diptera (left unnamed). Stephens's specific names listed under the undescribed genus are not, in the literal sense, combined into binomina but they are associated with the generic name *Tachina;* in the list that follows they have therefore been cited in combination with *Tachina*.

A few of Stephens's specific names that he cited in Tachinid genera are known (from specimens in his collection) to apply to species that are no longer considered to be Tachinidae. Such names are listed below in square brackets and are considered further on p. 297.

The serial numbers cited in the reference to each name are those given by Stephens (1829*b*) in the *Catalogue*. The large number cited first is the serial number given by Stephens to the species in the British insects as a whole, and the small number that follows in brackets is Stephens's serial number for that species in its particular genus.

Dexia albifrons Stephens, 1829*a* : 59; 1829*b* : 302 (No. 8820 (11)). *Nomen nudum*, without later validation.

Stephens's collection contained three male specimens standing under this name, all of which are *Thelaira nigripes* (Fabricius, 1794); the name *albifrons* Stephens is placeable in the synonymy of this species.

Dexia cinerea Stephens, 1829*a* : 60; 1829*b* : 303 (No. 8823 (14)). *Nomen nudum*, without later validation.

Stephens's collection lacks any specimens standing under this name, and the species for which Stephens intended it remains unknown.

[*Leucostoma nervosa*. Not Tachinidae, see p. 298].

[*Leucostoma venosa* (Stephens, not Meigen). Not Tachinidae, see p. 298].

Musca chrysostoma Stephens, 1829*b* : 303 (No. 8825 (16)). Unavailable name first published as a synonym.

Stephens published this name as 'Mu. chrysostoma. *Mus. Marsham*' and placed it in synonymy with '*Dexia canina*' (now *Dexiosoma caninum*). Specimens of *Dexiosoma caninum* (Fabricius, 1781) in Stephens's collection are correctly identified, and the unavailable name *chrysostoma* is therefore retained in synonymy with *caninum*.

Musca longipes Stephens, 1829*b* : 302 (No. 8822 (13)). Unavailable name first published as a synonym.

Stephens published this name as 'Mu. longipes. *Mus. Marsham.*' and placed it in synonymy with *Dexia rustica* (Fabricius, 1775). Specimens of *Dexia rustica* in Stephens's collection are correctly identified, and the unavailable name *longipes* is therefore retained in synonymy with *rustica*.

[*Musca putris*. Not Tachinidae, see p. 298].

Tachina apicalis Stephens, 1829*a* : 59; 1829*b* : 298 (No. 8755 (7)). *Nomen nudum*, without later validation.

Stephens's collection contained one male specimen standing under this name. It is a specimen of *Pales pavida* (Meigen, 1824), and *apicalis* Stephens is placeable in the synonymy of this species.

Tachina bimaculata Stephens, 1829*a* : 59; 1829*b* : 298 (No. 8759 (11)). *Nomen nudum*, without later validation.

Stephens's collection contained one female specimen standing under this name. It is a specimen of *Phryxe nemea* (Meigen, 1824), and *bimaculata* Stephens is placeable in the synonymy of this species.

Tachina cognata Stephens, 1829*a* : 59; 1829*b* : 298 (No. 8752(4)). *Nomen nudum*, without later validation.

Stephens's collection contained one female specimen standing under this name. It is a specimen of *Epicampocera succincta* (Meigen, 1824), and *cognata* Stephens is placeable in the synonymy of this species.

Tachina dubia Stephens, 1829*a* : 59; 1829*b* : 299 (No. 8779 (31)). *Nomen nudum*, without later validation.

Stephens's collection contained one female specimen standing under this name. It is a specimen of *Lydella grisescens* Robineau-Desvoidy, 1830, and *dubia* Stephens is placeable in the synonymy of this species.

[***Tachina nana.*** Not Tachinidae, see p. 299].

Tachina nigrolineata Stephens, 1829*a* : 59; 1829*b* : 299 (No. 8763 (15)). *Nomen nudum*, subsequently validated as ***Tachina nigrolineata*** Walker, 1853, q.v.

Stephens's collection contained one female specimen standing under this name. This specimen was subsequently described by Walker (1853 : 85) and is the holotype of *T. nigrolineata* Walker. The specific name is valid with Walker's authorship for the single British species of *Pseudoperichaeta* Brauer & Bergenstamm (see p. 288).

Tachina plumbea Stephens, 1829*a* : 59; 1829*b* : 298 (No. 8754 (6)). *Nomen nudum*, without later validation.

Stephens's collection contained a male and a female specimen standing under this name. Both are specimens of *Pales pavida* (Meigen, 1824), and *plumbea* Stephens is placeable in the synonymy of this species.

Tachina quadricincta Stephens, 1829*a* : 59; 1829*b* : 299 (No. 8765 (17)). *Nomen nudum*, subsequently validated as ***Tachina quadricincta*** Walker, 1853, q.v.

Stephens's collection contained one female specimen standing under this name. This specimen was subsequently described by Walker (1853 : 84) and is the holotype of *T. quadricincta* Walker; the name is a junior synonym of *Phryxe nemea* (Meigen, 1824) (see p. 290).

Tachina testaceipes Stephens, 1829*a* : 59; 1829*b* : 299 (No. 8767 (19)). *Nomen nudum*, without later validation.

Stephens's collection contained one male specimen standing under this name. It is a specimen of *Phryno vetula* (Meigen, 1824), and *testaceipes* Stephens is placeable in the synonymy of this species.

THE STATUS, IDENTITY AND SYNONYMY OF THE GENERIC NAME *TRIARTHRIA* STEPHENS

Walker did not propose any generic names in the British Tachinidae, but Stephens published one such name, viz. *Triarthria*. This name appeared in the *Nomenclature of British Insects* (Stephens, 1829*a* : 59) and again in the *Systematic Catalogue of British Insects* (Stephens, 1829*b* : 300). The name is marked in Neave's *Nomenclator Zoologicus* (1940, **4** : 533) as a *nomen nudum* because it was not accompanied in either of Stephens's works by a description. However, it is now evident from the *International Code of Zoological Nomenclature* that it is not a *nomen nudum* but is an available name under the provisions of Article 16(a) (v), since Stephens cited three available specific names in combination with *Triarthria*.

The three species included in *Triarthria* were *bicolor* Meigen, 1824, *spinipennis* Meigen, 1824, and *albicollis* Meigen, 1824, all of which were cited by Stephens (1829*b*) with their correct original references and were rightly identified (the correctness of Stephens's identifications was confirmed during this work by examination of the specimens still standing under the three names in the Stephens collection). The name *Triarthria* ('three joints') must without doubt allude to the tripartite nature of the arista in the species which Stephens aggregated in the genus, a character which is extremely striking in *spinipennis*.

In current classification the three species that Stephens placed in *Triarthria* belong to different genera: *bicolor* is a species of *Ceromya* Robineau-Desvoidy, 1830 (the specific name applying to the type-species); *spinipennis* is a species of *Bigonicheta* Rondani, 1845; and *albicollis* is a species of *Neaera* Robineau-Desvoidy, 1830 (the specific name applying to the type-species). Since *Triarthria* has been for long unrecognized there has not been any type-designation made for it, but whichever of the three included species just cited is fixed as type-species the name will automatically supplant some other generic name (as *Triarthria*, dating from 1829, has priority over all the other generic names potentially involved).

The European Tachinidae are now under very active study by a number of workers and the systematics is moving gradually from the alpha to the beta stages. At this transitional time many familiar generic names are falling into synonymy as older names are interpreted correctly from detailed study of their types, but there are few if any cases where application to the International Commission on Zoological Nomenclature to preserve a junior synonym is really justified. As a firm believer in the over-riding value of the Law of Priority I am therefore bringing *Triarthria* into use and am here designating *Tachina spinipennis* Meigen, 1824, as its type-species. (It should be noted here that Westwood, 1840 : 138, mentioned *Triarthria* and *spinipennis* but that his mention cannot be construed as a valid type-fixation.)

The effect of this type-designation is to make *Triarthria* a senior synonym for *Bigonicheta* Rondani, the name hitherto applied (either under this spelling or with several variant alternatives) to a familiar genus of earwig parasites occurring in the Palaearctic Region and (by introduction) in the Nearctic Region. In deciding which of the three included species to designate as type-species I have weighed the arguments that would favour one course over another (any designation involves *Triarthria* superseding some other generic name) and am satisfied that the balance is in favour of designating *spinipennis* and thereby sinking *Bigonicheta*. In order that other workers shall appreciate the reasons why *spinipennis* has been chosen they are here enumerated.

(1) The 'three-jointed' nature of the arista (with its very elongate first and second segments) is exceedingly conspicuous in this species (more so than in the others).

(2) Six correctly identified specimens of *spinipennis* stood in the Stephens collection, as compared to only one each of others.

(3) Westwood knew of Stephens's genus and mentioned only *spinipennis* in relation to it.

(4) Designation of *spinipennis* changes a generic name for the Holarctic area only (whereas designation of *bicolor* would change a name currently in use in all the major Old World regions).

(5) It eliminates at last the long-persistent muddle that has bedevilled the literature because of emendations and erroneous spellings of *Bigonicheta*.

(6) Dr B. Herting, specialist on western European Tachinidae, informs me (personal communication) that he too, in the circumstances, is inclined to the fixation of *spinipennis*.

The synonymy of *Triarthria* is now as set out below. In the synonymy confirmed nomenclatorial synonyms are given first, followed by a doubtful synonym and incorrect subsequent spellings (the last in alphabetical order). (The variant spellings of *Bigonicheta* have been investigated with special attention to those cited in Neave's *Nomenclator Zoologicus:* all of the usages traced are considered to have the status of incorrect subsequent spellings under the *Code* and not to be emendations, since they are not *demonstrably* intentional.)

TRIARTHRIA Stephens, 1829

Triarthria Stephens, 1829*a* : 59; 1829*b* : 300. Type-species: *Tachina spinipennis* Meigen, 1824, by PRESENT DESIGNATION. BRITAIN.

Bigonicheta Rondani, 1845 : 32, 34. Type-species: *Bigonicheta mariettii* Rondani, 1845 [= *Tachina setipennis* Fallén, 1810], by monotypy. ITALY. **Syn. n.**

Dira Gistl, 1848 : xi. Unnecessary replacement name for *Triarthria* Stephens (cited as *Triarthra*, attributed to Meigen in error), preoccupied by *Dira* Hübner, 1819.

Ramburia Robineau-Desvoidy, 1851 : 189. Type-species: *Tachina setipennis* Fallén, 1810, by monotypy. SWEDEN. **Syn. n.**

Trichonevra Lioy, 1864 : 1341. Type-species: *Tachina spinipennis* Meigen, 1824, by monotypy. GERMANY. **Syn. n.** [Objective synonym of *Triarthria*.]

? *Osmaea* Robineau-Desvoidy, 1830 : 84. Type-species: *Osmaea grisea* Robineau-Desvoidy, 1830, by monotypy. FRANCE.

Bigonichaeta. Incorrect subsequent spelling of *Bigonicheta* Rondani.

Bigonochaeta. Incorrect subsequent spelling of *Bigonicheta* Rondani.

Digonichaeta. Incorrect subsequent spelling of *Bigonicheta* Rondani.

Digonicheta. Incorrect subsequent spelling of *Bigonicheta* Rondani.,

Digonochaeta. Incorrect subsequent spelling of *Bigonicheta* Rondani.

As the result of the above new synonymy of *Bigonicheta* the following two new combinations are here established:

Triarthria setipennis (Fallén, 1810) **comb. n.**
Triarthria spinipennis (Meigen, 1824) **comb. n.**

NAMES OF WALKER AND STEPHENS PURPORTEDLY FOR THE BRITISH TACHINIDAE BUT APPLYING IN OTHER FAMILIES

Walker (1853) described several nominal species in the genus *Tachina* Meigen that are known, or believed without doubt, not to be Tachinidae, the names applying to species of Sarcophagidae or Rhinophoridae. Stephens (1829*a*; 1829*b*) published a few names that are *nomina nuda* and purportedly applied to British Tachinidae, but that are now known (from specimens in the Stephens collection) to apply to

Rhinophoridae. As all the names had to be investigated for the present work it has been thought useful to enumerate them here and to clarify their status, even though they are not strictly relevant to the Tachinidae. The names are listed alphabetically under their original binomina.

Leucostoma nervosa Stephens, 1829*a* : 59; 1829*b* : 300 (No. 8790 (9), as *venosa* by lapsus). *Nomen nudum*, without later validation.

Stephens's collection contained two male specimens standing under this name (*nervosa*), both of which are *Melanomya nana* (Meigen, 1826); the name *nervosa* Stephens is placeable in the synonymy of this species of Rhinophoridae.

Musca putris Stephens, 1829*b* : 302 (No. 8813 (4)). Unavailable name first published as a synonym.

Stephens published this name as 'Mu. putris. *Mus. Marsham*' and placed it in synonymy with '*Dexia melania*', but Stephens misidentified *melania*. The true *melania* Meigen, 1824, is a Tachinid belonging in the genus *Medina* Robineau-Desvoidy, 1830 (see Herting, 1972 : 10) and does not occur in the British fauna, but the specimens (2 ♂, 1 ♀) from Stephens's collection named as *melania* are actually specimens of *Stevenia atramentaria* (Meigen, 1824); the name *putris* Stephens is therefore placeable in the synonymy of this species of Rhinophoridae.

Tachina caminaria Walker, 1853 : 35 (No. 36). Holotype ♀, ENGLAND (BMNH, ex coll. Stephens).

The holotype has lost both hind legs and the left mid leg but is otherwise in very good condition. It bears a printed label 'caminaria,' from Stephens's collection.

Identity. **Syn. n.** of ***Stevenia atramentaria*** (Meigen, 1824) [Rhinophoridae]. Verrall (1888 pt. 2 : 4) listed *caminaria* as possibly a species of *Leucostoma* Meigen, and Bezzi (1907 : 328) wrongly placed it – under the neuter spelling *caminarium* – as a synonym of *Leucostoma simplex* (Fallén).

Tachina contempta Walker, 1853 : 77 (No. 133). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype is in very good condition except for the loss of the right third antennal segment, the vibrissae and some frontal setae. It bears a printed label '132 contempta *Walk.*'.

Identity. **Syn. n.** of ***Sarcophaga nigriventris*** Meigen, 1826 [Sarcophagidae].

Tachina expetita Walker, 1853 : 36 (No. 38). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium* but almost certainly applied in the Rhinophoridae and not in Tachinidae. This is suggested by the description, Walker's (1853 : 15) key placement, and the fact that he closely associated it with *caminaria* (= *atramentaria*) and *atramentaria*. It is therefore here regarded as a *nomen dubium* in Rhinophoridae.

Tachina exsecta Walker, 1853 : [298]. Replacement name for *Tachina intersecta* Walker, 1853 : 76, primary homonym of *Tachina intersecta* Walker, 1853 : 38.

Walker (1853) described two different species with the name *Tachina intersecta*, but published the replacement name *T. exsecta* for the second use of the name *intersecta* in a table of 'Errata' on an unnumbered page immediately following the last numbered page of the work (p. 297). Type-information for *T. exsecta* is given under *T. intersecta* below, q.v.

Identity. **Syn. n.** of ***Sarcophaga nigriventris*** Meigen, 1826 [Sarcophagidae]. Bezzi (1907 : 319) placed *exsecta* in a list of *Phorocera* 'Species dubiae'.

Tachina intercepta Walker, 1853 : 34 (No. 33). Type(s) [? sex], ENGLAND (lost).

Identity. Junior synonym of ***Phyto melanocephala*** (Meigen, 1824) [Rhinophoridae]. The synonymy of *intercepta* with *melanocephala* was first established by Bezzi (1907 : 462).

I have been unable to discover what evidence Bezzi had for this synonymy, which does not appear to have been given anywhere by Verrall (upon whose lists Bezzi mainly depended for information on Walker's names); however, the description of *intercepta*, for what it is worth, does not noticeably conflict with the characters of *Phyto melanocephala* and I therefore maintain the synonymy as correct.

Tachina interlapsa Walker, 1853 : 37 (No. 41). Type(s) [? sex], ENGLAND (lost).

Identity. **Syn. n.** of ***Melanophora roralis*** (Linnaeus, 1758) [Rhinophoridae]. Bezzi (1907 : 457) cited *interlapsa* as a synonym of *Stevenia atramentaria* (Meigen) [Rhinophoridae], but I am convinced that this synonymy – which must have been made by guesswork since Verrall had not suggested such a placement in his lists – is wrong. *S. atramentaria* is one of the largest British Rhinophorids, and Walker's description gave the length of *interlapsa* as only 1½ lines, this alone contra-indicating *Stevenia*. However there is really no doubt from description and key placement (Walker, 1853 : 16) that *interlapsa* was a Rhinophorid, and it seems certain that it was the same as *Melanophora roralis*. Walker's description picks out just those features of the wing colour and venation, shining black non-pollinose body and subcylindrical abdomen that exactly fit *roralis* (together with the small size). Walker's Latin description reads 'Nigra, gracilis, alis alulisque nigricantibus, venis cubitali et praebrachiali conjunctis, abdomine subcylindrico. Long 1½; alar. 3 lin.', and the English description elaborates details of the conformation of the wing veins perfectly as in *roralis*; the petiole is very long ('praebrachial vein . . . joining the cubital at about four-fifths of the length of the latter'), cross-vein *m-cu* is very remote from the end of vein Cu_1 ('discal transverse vein [i.e. *m-cu*] straight, obliquely parted from the hind border by about thrice its own length from the border [of the wing]', and *m-cu* joins vein *M* unusually far from the bend ('flexure') of *M* ('discal transverse vein . . . more than twice its length from the flexure of the praebrachial'). These characteristics taken in conjunction with the small size cited, the polished black colour and 'wings blackish', justify the positive conclusion that *interlapsa* is a junior synonym of *roralis* (**syn. n.**).

Tachina interlatens Walker, 1853 : 35 (No. 37). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium* but almost certainly applied in the Rhinophoridae and not in Tachinidae. The description and Walker's (1853 : 15) key placement appear to indicate a Rhinophorid with petiolate cell R_5, and it is possible that *interlatens* was the same as *Rhinophora lepida* (Meigen). Definite synonymy is not justified, and the name is here regarded as a *nomen dubium* in Rhinophoridae.

Tachina intersecta Walker, 1853 : 76 (No. 130). Holotype ♂, ENGLAND (BMNH, ex coll. Desvignes). Primary homonym of *T. intersecta* Walker (1853 : 38), see *T. exsecta* Walker (replacement name).

The holotype has lost the left mid leg, right hind leg, the apex of the left wing and a few setae but is otherwise in good condition; the genitalia are separately mounted on a card. It bears a label reading 'T. Intersecta. Walker's original type from Desvignes' collection' in an unrecognized handwriting, and a rectangular red-bordered label reading 'HOLOTYPE ♂ Tachina intersecta Walker 1853, Ins. Brit. Dipt., 2: 76' in Pont's writing.

Identity. See entry for *Tachina exsecta*. *T. intersecta* (2) enters into new synonymy with ***Sarcophaga nigriventris*** Meigen, 1826 [Sarcophagidae].

Tachina mera Walker, 1853 : 65 (No. 106). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype has the right eye crushed, the right leg missing and some fungal threads but is otherwise in good condition. It bears a printed label '105 mera *Walk.*'.

Identity. **Syn. n.** of ***Melanomya nana*** (Meigen, 1826) [Rhinophoridae].

Tachina nana Stephens, 1829*a* : 59; 1829*b* : 299 (No. 8780 (32)). *Nomen nudum*, subsequently validated as *Tachina nana* Walker, 1853, q.v. below.

Stephen's collection contained one male specimen standing under this name. This specimen was subsequently described by Walker (1853 : 39) and is the holotype of *T. nana* Walker; the name is a junior synonym of *Rhinophora lepida* (Meigen, 1824).

Tachina nana Walker, 1853 : 39 (No. 46) (validation of *T. nana* Stephens, 1829*a*, *b*, *nomen nudum*). Holotype ♂, ENGLAND (BMNH, ex coll. Stephens).

The holotype is in good condition except for loss of both mid legs, the left fore tarsus and the tip of the left hind tarsus. It bears a printed label from the Stephens collection reading 'nana *mihi*'.

Identity. **Syn n.** of ***Rhinophora lepida*** (Meigen, 1824) [Rhinophoridae].

Tachina nexa Walker, 1853 : 63 (No. 101). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype is slightly mouldy and has lost the right hind leg and the apices of the left tarsi but is otherwise in good condition. It bears a printed label '100 nexa *Walk.*'.

Identity. **Syn. n.** of ***Phyto melanocephala*** (Meigen, 1824) [Rhinophoridae].

Tachina pertracta Walker, 1853 : 45 (No. 60). Type(s) [? sex], ENGLAND (lost).

Identity. Unknown, the name remains a *nomen dubium* in the Sarcophagidae. From the description, which refers to the arista being plumose on the basal half and the mesonotum being trivittate (as in *Sarcophaga* s.l. and other Sarcophagidae) it appears quite certain that *pertracta* was a Sarcophagid.

Tachina senta Walker, 1853 : 68 (No. 113). Holotype ♂, ENGLAND (BMNH, ex coll. Walker).

The holotype is in good condition except that the ptilinum is partially extruded, the left fore leg lost, the apices of the mid tarsi lost, and the abdomen slightly dirty. It bears a printed label '112 senta *Walk.*'.

Identity. **Syn. n.** of ***Brachicoma devia*** (Fallén, 1820) [Sarcophagidae].

Tachina separata Walker, 1853 : 67 (No. 111). Holotype ♀, ENGLAND (BMNH, ex coll. Saunders). Junior primary homonym of *Tachina separata* Meigen, 1824.

The holotype has lost the head and abdomen but the remainder is in very good condition except for loss of the tips of the right fore and mid tarsi. It bears a circular green-edged type label on which Austen has written the name in black ink.

Identity. Junior synoym of ***Brachicoma devia*** (Fallén, 1820) [Sarcophagidae]. The synonymy of *separata* with *devia* was first established by Austen (1907 : 329) and is here confirmed. Presumably the head and abdomen were present on the type when it was examined by Austen, as he did not comment on them. Although *T. separata* Walker is a junior primary homonym of *T. separata* Meigen no new name is required (being obviated by the synonymy of the former with *devia*).

LECTOTYPE DESIGNATIONS FOR SOME NOMINAL SPECIES DESCRIBED BY FALLÉN

In order reliably to determine the identities of several of Walker's nominal species it has been necessary to compare the types with those of some nominal species described by Fallén. Most of Fallén's Tachinidae are at present based on syntypic type-series, no lectotypes having yet been designated for most of the nominal species. Some of these type-series are mixed and lectotype designations are therefore desirable. Lectotypes are here designated for ten of Fallén's nominal species, all of which are currently considered valid. In the instances of mixed series the lectotype designations here made maintain existing usage.

It appears to have been Fallén's practice to attach a name label to only one of his specimens, or occasionally to one of each sex, and not to attach any locality data. Consequently most specimens standing in the Fallén collection at Stockholm have no labels at all and their identity is determined by the place labels in the collection. All specimens standing against a particular name have been accepted as original syntypes unless there is contrary evidence; in some instances only the male sex was originally described and female specimens are therefore excluded from the type-series, and in other instances there are special clues (such as labels linking specimens to literature that post-dates the description) that contra-indicate syntype status.

The ten nominal species for which lectotypes are here designated were all described in *Tachina* Meigen and are listed alphabetically. The paralectotypes that are correctly associated with the lectotypes are differentiated from the misassociated paralectotypes and the actual identities of the latter are cited. As there are no locality data on the specimens the type-locality information has all been derived from the literature. Some original specimens of the species cited stand in the Zetterstedt collection at the Zoological Institute, Lund; these have not been seen as they have no nomenclatorial significance now that the lectotypes in the main Fallén collection at Stockholm are designated. All syntypes seen have been appropriately labelled to show their status and their currently correct binomina.

Tachina assimilis Fallén, 1810 : 283. LECTOTYPE ♂, SWEDEN [no other locality data] (NR, Stockholm).

Paralectotypes (misassociated): 8 ♂, data as lectotype (NR, Stockholm).

The lectotype has lost the left mid and hind legs and has a large hole in the left side of the thorax and abdominal base but is otherwise in good condition. It bears Fallén's faded ink label reading 'T. assimilis ♂'.

Fallén originally described only the male, but later (Fallén, 1820 : 28) described both sexes. Three females stand in the Fallén collection under the name *assimilis* but are excluded from the syntype series as the female was not an originally described sex. All eight males standing under *assimilis* are accepted as original specimens (paralectotypes) as there is no contrary evidence; one has a Fallén label reading 'Tachina assimilis ♂ Fallén' and another has a faded ink number '33'.

The specimen designated as lectotype belongs to a different species from all the other specimens, but its designation is essential in order to preserve the past meaning of *assimilis*. This species is the type-species of *Phorocera* Robineau-Desvoidy, 1830, and the designation of lectotype here made ensures that the name *assimilis* continues to apply to the same species as in the past. All the paralectotypes, and two of the three females that lack type-status, belong to another species that Fallén also described, viz. *Phorocera obscura* (Fallén, 1810 : 283) (lectotype ♂ designated by van Emden and in Lund) and have been labelled accordingly. The third female specimen is true *assimilis*, conspecific with the lectotype.

Tachina cinerea Fallén, 1810: 268. LECTOTYPE ♂, SWEDEN: Skåne, Äsperöd [= Esperöd] (NR, Stockholm).

Paralectotype (misassociated): 1 ♀, data as lectotype (NR, Stockholm).

The lectotype is in excellent condition. It bears Fallén's faded ink label reading 'Tachina cinerea ♂ Fall.'.

The ♀ paralectotype is a specimen of *Meigenia* Robineau-Desvoidy; it bears Fallén's label reading 'T. cinerea ♀ var. palp. nig.' and an identification label of Dr D. M. Wood naming it as *Meigenia* sp.

In the original description Fallén cited *cinerea* as met with on arable lands without specifying a locality, but he later (Fallén, 1820 : 20) cited the locality as 'Esperöd'. This is the place where Fallén had his manorial estate (some 20 km north of the town of Simrishamn on the south-east coast of Skåne), on which he collected many of his insects (Persson, personal communication).

There are no syntypes of this species standing in the Zetterstedt collection.

Tachina dispar Fallén, 1820 : 31 (No. 64). LECTOTYPE ♀, SWEDEN [no other locality data] (NR, Stockholm).

Paralectotype (misassociated): 1 ♂, data as lectotype (NR, Stockholm).

The lectotype is in excellent condition except for a small tear on the costal region of the right wing. It bears Fallén's ink label reading 'Tachina dispar ♂ ♀ an Musca dubitata dist?'.

The ♂ specimen in the Fallén collection at Stockholm is regarded as a syntype, although it was referred to at the end of the original description as 'Var. β.'. It is not conspecific with the ♀ lectotype (belonging to another, unidentified, species of *Macquartia*) and bears Fallén's label 'var. seta ant. pubescente', together with a Zetterstedt label reading 'T. egens ♂ Meig.'. The ♀ is designated as lectotype to conform with the species that has long been known as *Macquartia dispar* (Fallén).

The Zetterstedt collection in Lund contains two original specimens of *dispar* from 'Mus Fall.' (i.e. Fallén collection) that are evidently syntypes (paralectotypes) and are on the same pin; they have not been seen.

Tachina dubia Fallén, 1810 : 284. LECTOTYPE ♂, SWEDEN: Skåne, Äsperöd [= Esperöd] (NR, Stockholm).

Paralectotype (correctly associated): 1 ♂, data as lectotype (NR, Stockholm).

The lectotype has lost the right legs, the left mid leg, most of the left hind tarsus and the right third antennal segment, but is otherwise in good condition. It is on a rather slender pin and bears Fallén's faded ink label reading 'T. dubia ♂ Fallén.'. The paralectotype has a faded ink label reading '28'.

Standing with the lectotype and paralectotype in Stockholm are two correctly associated female specimens, one of which has Fallén's label 'T. dubia ♀ Fall.'. These females are deemed to have no type-status, as only the male was originally described; Fallén (1820 : 29) described the female subsequently.

Tachina floralis Fallén, 1810 : 287. LECTOTYPE ♂, SWEDEN [no other locality data] (NR, Stockholm).

Paralectotypes (correctly associated): 2 ♀, data as lectotype (NR, Stockholm).

Paralectotypes (misassociated): 2 ♂, data as lectotype (NR, Stockholm).

The lectotype has lost both fore legs and both mid legs, but is otherwise in good condition except for a few missing setae. It bears Fallén's faded ink label reading 'Tachina floralis ♂ Fallén'. One of the ♀ paralectotypes bears Fallén's label 'Tach. floralis ♀ Fall.' and is in fair condition; the other is unlabelled and lacks the head.

One of the misassociated ♂ paralectotypes, and possibly both, belong to Fallén's 'Var. β', as one bears an original Fallén label reading 'T. floralis β Fallén'. Both misassociated males are specimens of *Meigenia* Robineau-Desvoidy, and the one with Fallén's label bears Dr D. M. Wood's determination label as *Meigenia mutabilis* (Fallén).

Two paralectotypes (not seen) are in the Zetterstedt collection at Lund.

Tachina nigrita Fallén 1810 : 286. LECTOTYPE ♂, SWEDEN: Skåne, Äsperöd [= Esperöd] (NR, Stockholm).

Paralectotypes (correctly associated): 2 ♀, data as lectotype (NR, Stockholm).

The lectotype is in excellent condition except for loss of the left fore leg and a tear in the right wing. It bears Fallén's faded ink label reading 'T. nigrita ♂ Fall.'. One of the ♀ paralectotypes bears Fallén's label 'T. nigrita ♀ Fall' and the other (which lacks the abdomen) has a faded ink label apparently reading '55'.

There are no syntypes of this species in the Zetterstedt collection.

The type-locality was not cited in the original description but was given later by Fallén (1820 : 35) as Esperöd.

Tachina pilipennis Fallén, 1810 : 273 (as *pilipfnnis* by typographical error). LECTOTYPE ♂, SWEDEN: Skåne, ? Äsperöd [= Esperöd] (NR, Stockholm).

Paralectotypes (correctly associated): 3 ♂, 3 ♀, data as lectotype (NR, Stockholm).

The lectotype is in good condition except for loss of the left mid leg and a little mould. It bears Fallén's faded ink label reading 'Tachina pilipennis ♂ Fallén'. One of the ♀ paralectotypes bears Fallén's label reading 'T. pilipennis ♀ Fallén.' and one of the ♂ paralectotypes has a label in black ink in Zetterstedt's hand reading 'T. crassicornis. Meig. pilipennis Fall ♂.'; another ♂ paralectotype has a label with a '♂' sex sign, probably attached by Zetterstedt.

The type-locality was not specified by Fallén, but Zetterstedt (1844 : 1045) mentions 'Esperöd' as one locality, and this may well be the true type-locality.

One specimen (not seen) is in the Zetterstedt collection at Lund and may be another paralectotype.

Tachina plebeja Fallén, 1810 : 269. LECTOTYPE ♂, SWEDEN [no other locality data] (NR, Stockholm).

Paralectotypes (correctly associated): 1 ♂, 5 ♀, data as lectotype (NR, Stockholm).

The lectotype has the third antennal segments partially eaten out and has lost the aristae but is otherwise in excellent condition. It bears Fallén's faded ink label reading 'Tachina plebeja ♂ Fallén'. One of the ♀ paralectotypes has Fallén's label 'Tachina plebeja ♀ Fallén.', and all other paralectotypes are unlabelled.

Standing with the original syntypes is one ♀ specimen bearing a faded ink label reading 'Bohemann'. This label almost certainly ties this specimen to Fallén's (1820 : 13) record of a specimen collected by Boheman in 'Smolandia' (= Småland), and indicates that it cannot be an original syntype. It has no type-status.

One original specimen (paralectotype, not seen) is in Zetterstedt's collection in Lund.

Tachina rustica Fallén, 1810 : 264. LECTOTYPE ♂, SWEDEN: Skåne, Asperöd [= Esperöd] (NR, Stockholm).

Paralectotypes (correctly associated): 5 ♂, 3 ♀, data presumed as lectotype (NR, Stockholm).

Paralectotypes (misassociated): 4 ♂, 1 ♀, data presumed as lectotype (NR, Stockholm).

The lectotype is in perfect condition and is unlabelled. A headless ♂ paralectotype bears Fallén's faded ink label reading 'Tachina rustica ♂ Fallén' and a ♀ paralectotype bears Fallén's label 'Tachina rustica ♀ Fall.'; the other paralectotypes are unlabelled and one has the ♂ genitalia extracted and card-mounted.

The misassociated paralectotypes belong to two species: two males are specimens of *Exorista* (*Adenia*) *mimula* (Meigen) (one with genitalia extracted and card-mounted), and two males and a female are specimens of *Exorista* (*Adenia*) *tubulosa* Herting; of the latter the female and one of the males are mounted on the same pin and this male has the genitalia extracted and card-mounted.

Two specimens (not seen) in the Zetterstedt collection at Lund, standing under the name *Tachina larvarum* L., bear original Fallén labels and are probably syntypes (paralectotypes).

Tachina vulgaris Fallén, 1810 : 282. LECTOTYPE ♂, SWEDEN [no other locality data] (NR, Stockholm).

Paralectotypes: (correctly associated): 5 ♂, 5 ♀, data as lectotype (NR, Stockholm).

Paralectotypes (misassociated): 3 ♂, 1 ♀, data as lectotype (NR, Stockholm).

The lectotype is in perfect condition and is unlabelled. A ♂ paralectotype bears Fallén's faded ink label reading 'Tachina vulgaris ♀ [sic] Fallén.', one of the ♀ paralectotypes has a Fallén label reading 'Tachina vulgaris ♀ Fallén' and another ♀ has a label reading 'T. vulgaris ♀' (probably in Fallén's hand). One of the unlabelled correctly associated ♂ paralectotypes has the genitalia extracted and card-mounted.

The misassociated paralectotypes belong to three species. One ♂ bears a Fallén label reading 'Tachina vulgaris ♂ Fallén' and is a specimen of *Aplomya confinis* (Fallén); it bears a 1969 determination label of Dr D. M. Wood with the name 'confinis.'. Two unlabelled males are specimens of *Thelymyia saltuum* (Meigen), and the unlabelled ♀ is a specimen of *Blondelia nigripes* (Fallén).

One original specimen (not seen) labelled by Fallén is in the Zetterstedt collection in Lund.

SUMMARY OF NEW SYNONYMS AND NEW COMBINATIONS

The nomenclatural changes established in this paper are summarized below in their appropriate categories. The order is alphabetical and in the synonymies the invalid junior names are cited first. The family is indicated for names that do not apply in the Tachinidae.

New synonymy in generic names

Bigonicheta Rondani, **syn. n.** of *Triarthria* Stephens.
Ramburia Robineau-Desvoidy, **syn. n.** of *Triarthria* Stephens.
Trichonevra Lioy, **syn. n.** of *Triarthria* Stephens.

New synonymy in specific names

Chetina setigena Rondani, **syn. n.** of *Chetina ambivius* (Walker).
Phryxe insidiosa Robineau-Desvoidy, **syn. n.** of *Pseudoperichaeta nigrolineata* (Walker).
Tachina accidens Walker, **syn. n.** of *Phyllomya volvulus* (Fabricius).
Tachina amphiro Walker, **syn. n.** of *Phryxe heraclei* (Meigen).
Tachina caminaria Walker, **syn. n.** of *Stevenia atramentaria* (Meigen) [Rhinophoridae].
Tachina certans Walker, **syn. n.** of *Timavia amoena* (Meigen).
Tachina clymene Walker, **syn. n.** of *Zophomyia temula* (Scopoli).
Tachina collecta Walker, **syn. n.** of *Phryxe vulgaris* (Fallén).
Tachina commissa Walker, **syn. n.** of *Lypha dubia* (Fallén).
Tachina comosa Walker, **syn. n.** of *Lypha dubia* (Fallén).
Tachina computa Walker, **syn. n.** of *Campogaster exigua* (Meigen).
Tachina constans Walker, **syn. n.** of *Phryxe vulgaris* (Fallén).
Tachina contempta Walker, **syn. n.** of *Sarcophaga nigriventris* (Meigen) [Sarcophagidae].
Tachina crisia Walker, **syn. n.** of *Eurithia anthophila* (Robineau-Desvoidy).
Tachina defecta Walker (1), **syn. n.** of *Billaea irrorata* (Meigen).
Tachina delitescens Walker, **syn. n.** of *Timavia amoena* (Meigen).
Tachina demota Walker, **syn. n.** of *Lydella grisescens* Robineau-Desvoidy.
Tachina denotans Walker, **syn. n.** of *Dinera grisescens* (Fallén).
Tachina diniele Walker, **syn. n.** of *Pales pumicata* (Meigen).
Tachina discrepans Walker, **syn. n.** of *Lydella grisescens* Robineau-Desvoidy.
Tachina distermina Walker, **syn. n.** of *Phryxe vulgaris* (Fallén).
Tachina excessa Walker, **syn. n.** of *Dufouria nigrita* (Fallén).
Tachina exscensa Walker, **syn. n.** of *Actia pilipennis* (Fallén).
Tachina exsecta Walker, **syn. n.** of *Sarcophaga nigriventris* (Meigen) [Sarcophagidae].
Tachina immissa Walker, **syn. n.** of *Lydella grisescens* Robineau-Desvoidy.
Tachina infensans Walker, **syn. n.** of *Pales pavida* (Meigen).
Tachina infixa Walker, **syn. n.** of *Zaira cinerea* (Fallén).
Tachina insuscepta Walker, **syn. n.** of *Exorista larvarum* (Linnaeus).
Tachina interlapsa Walker, **syn. n.** of *Melanophora roralis* (Linnaeus) [Rhinophoridae].
Tachina intersecta Walker (1), **syn. n.** of *Lypha dubia* (Fallén).

Tachina intersecta Walker (2), **syn. n.** of *Sarcophaga nigriventris* (Meigen) [Sarcophagidae].
Tachina menestho Walker, **syn. n.** of *Phorocera obscura* (Fallén).
Tachina mera Walker, **syn. n.** of *Melanomya nana* (Meigen) [Rhinophoridae].
Tachina motor Walker, **syn. n.** of *Lydina aenea* (Meigen).
Tachina munita Walker, **syn. n.** of *Phorocera assimilis* (Fallén).
Tachina nana Walker, **syn. n.** of *Rhinophora lepida* (Meigen) [Rhinophoridae].
Tachina neglecta Walker (2), **syn. n.** of *Phryxe vulgaris* (Fallén).
Tachina nexa Walker, **syn. n.** of *Phyto melanocephala* (Meigen) [Rhinophoridae].
Tachina olizon Walker, **syn. n.** of *Macquartia praefica* (Meigen).
Tachina orbilius Walker, **syn. n.** of *Macquartia viridana* Robineau-Desvoidy.
Tachina perpingens Walker, **syn. n.** of *Elfia cingulata* (Robineau-Desvoidy).
Tachina quadricincta Walker, **syn. n.** of *Phryxe nemea* (Meigen).
Tachina reformata Walker, **syn. n.** of *Lydina aenea* (Meigen).
Tachina rejecta Walker, **syn. n.** of *Periscepsia spathulata* (Fallén).
Tachina retracta Walker, **syn. n.** of *Lydella grisescens* Robineau-Desvoidy.
Tachina reventa Walker, **syn. n.** of *Dufouria chalybeata* (Meigen).
Tachina senta Walker, **syn. n.** of *Brachicoma devia* (Fallén) [Sarcophagidae].
Tachina titormus Walker, **syn. n.** of *Macquartia dispar* (Fallén).
Tachina torta Walker, **syn. n.** of *Macquartia praefica* (Meigen).

New combinations

Chetina ambivius (Walker) **comb. n.**
Pseudoperichaeta nigrolineata (Walker) **comb. n.**
Triarthria setipennis (Fallén) **comb. n.**
Triarthria spinipennis (Meigen) **comb. n.**

SUMMARY OF CONFIRMED SYNONYMS

The following previously established synonymies have been confirmed.

Dexia aurinia Walker, junior syn. of *Dexia vacua* (Fallén).
Tachina admete Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina broteas Walker, junior syn. of *Actia pilipennis* (Fallén).
Tachina cerceis Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina intercepta Walker, junior syn. of *Phyto melanocephala* (Meigen) [Rhinophoridae].
Tachina internexa Walker, junior syn. of *Pales pavida* (Meigen).
Tachina intersita Walker, junior syn. of *Nemorilla floralis* (Fallén).
Tachina medoacus Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén)
Tachina megaleas Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina mesula Walker, junior syn. of *Demoticus plebejus* (Fallén).
Tachina nymphidius Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina pagasus Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina pamesos Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina philonis Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina pitho Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina separata Walker, junior syn. of *Brachicoma devia* (Fallén) [Sarcophagidae].
Tachina telestho Walker, junior syn. of *Exorista* (*Adenia*) *rustica* (Fallén).
Tachina thyamis Walker, junior syn. of *Pelatachina tibialis* (Fallén).
Tachina tyche Walker, junior syn. of *Phryxe vulgaris* (Fallén).

SUMMARY OF *NOMINA DUBIA*

The following names remain *nomina dubia* because of inadequate descriptions and loss of types:

Dexia fingens Walker
Tachina augens Walker
Tachina bijuncta Walker
Tachina comitata Walker
Tachina confecta Walker
Tachina conjuncta Walker
Tachina contracta Walker
Tachina defecta Walker (2)
Tachina demissa Walker
Tachina detracta Walker
Tachina disjuncta Walker
Tachina dispartita Walker
Tachina dispecta Walker
Tachina dispuncta Walker
Tachina distenta Walker
Tachina divulsa Walker
Tachina domator Walker
Tachina effecta Walker
Tachina emissa Walker
Tachina enodata Walker
Tachina enotata Walker
Tachina erecta Walker
Tachina erogata Walker
Tachina evidens Walker
Tachina evocata Walker
Tachina evoluta Walker
Tachina exacta Walker
Tachina exagens Walker
Tachina exclusa Walker
Tachina expetita Walker [Rhinophoridae]
Tachina expleta Walker
Tachina fissa Walker
Tachina flexa Walker
Tachina infestans Walker
Tachina inoperta Walker
Tachina inquilina Walker
Tachina insedata Walker
Tachina intacta Walker
Tachina intaminata Walker
Tachina intercedens Walker
Tachina interclusa Walker (1)
Tachina interclusa Walker (2)
Tachina interlatens Walker [Rhinophoridae]
Tachina intermixta Walker
Tachina interna Walker
Tachina intracta Walker
Tachina involuta Walker
Tachina multans Walker
Tachina neglecta Walker (1)
Tachina objecta Walker
Tachina particeps Walker
Tachina pertinens Walker
Tachina pertracta Walker [Sarcophagidae]
Tachina reclusa Walker
Tachina refecta Walker
Tachina viridulans Walker

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A REVISION OF THE PONERINE ANT GENUS *PLECTROCTENA* F. SMITH (HYMENOPTERA : FORMICIDAE)

B. BOLTON

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BY

BARRY BOLTON

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SYNOPSIS

The ponerine ant genus *Plectroctena* is revised. Three new species are described and eight new synonyms established. Keys are presented for the worker caste and for the known females. The affinities of the genus are discussed and the constituent species described. The genus *Cacopone* is synonymised with *Plectroctena*. The species *mabirensis* Arnold is transferred to *Psalidomyrmex* André, establishing a new combination. Known biological information on the species is included.

INTRODUCTION

THE sixteen known species of this small ponerine genus are restricted to the Ethiopian region. The majority are found only in the rain forest zones of West and Central Africa but a few species are found in the southern and eastern parts of the continent, and one is apparently restricted to the offshore Principe Island in the Gulf of Guinea. One species of central African origin has been recorded from the island of Fernando Po (Eidmann, 1944).

Nests are made directly into the earth (Arnold, 1915) or are built in extremely rotten or collapsed logs. A dealate female of one species, *minor* Emery, has been found in a fallen and rotting carton nest of a species of *Crematogaster* Lund.

Foraging is subterranean or cryptic and workers are often found beneath the bark of rotting logs. The workers forage singly or in small processions of two or three individuals. The main food of the genus appears to be millepedes and beetles (Arnold, 1915) although some species may also feed on termites and other soft-bodied arthropods which inhabit rotten wood. The feeding habits of the smaller and completely subterranean species are not known.

Previous publications on the genus are mostly represented by scattered descriptions of new forms and notes on distribution. Arnold (1915) gave notes on the South African species and Wheeler (1922*a*) included a few notes and comments on some of the central African species. A review of the genus was undertaken by Santschi (1924) which was little more than a vehicle for the description of numerous new, mainly infraspecific forms. His text is littered with contradictions and mistakes and the key presented therein is of little value. No attempt was made to ascertain the variation inherent in the commoner species.

The present paper is thus an attempt to delimit the known species more accurately and to give some insight into the variation, distribution and known habits of the members of this interesting small genus.

ABBREVIATIONS OF MUSEUMS

BMNH	British Museum (Natural History), London.
IE, Naples	Istituto di Entomologia Agraria, Naples.
IE, Bologna	Istituto di Entomologià, Bologna.
MCSN, Genoa	Museo Civico di Storia Naturale, Genoa.
MCZ, Cambridge	Museum of Comparative Zoology, Cambridge.
MNHU, Berlin	Museum für Naturkunde der Humboldt-Universität, Berlin.
MRAC, Tervuren	Musée Royal de l'Afrique Centrale, Tervuren.
NM, Basle	Naturhistorisches Museum, Basle.

MEASUREMENTS AND INDICES

Total Length (TL). The total outstretched length of the individual, from mandibular apex to the gastral apex.

Head Length (HL). The straight-line length of the head in perfect full-face view, measured from the mid-point of the anterior clypeal margin to the posteriormost point of the occipital margin (i.e. in species with a strongly concave occipital margin the head length is measured to the mid-point of a line connecting the posterolateral projections).

Head Width (HW). The maximum width of the head measured behind the eyes in full-face view.

Cephalic Index (CI). $\frac{\text{HW} \times 100}{\text{HL}}$

Mandibular Length (ML). The straight-line length of the mandibular blade measured from the apex to the point at which the outer margin meets the clypeus.

Mandibulo-Cephalic Index (MI). $\frac{\text{ML} \times 100}{\text{HL}}$

Scape Length (SL). The straight-line length of the scape, excluding the basal constriction or neck.

Petiole Height (PH). The height of the petiole measured in profile from the apex of the ventral process vertically to a line intersecting the dorsalmost point of the node.

Petiole Length (PL). The length of the petiole node from the anterior process to the posteriormost point of the tergite, where it surrounds the gastral articulation.

Lateral Petiole Index (LPI). $\frac{\text{PH} \times 100}{\text{PL}}$

Dorsal Petiole Width (DPW). The maximum width of the petiole in dorsal view.

Dorsal Petiole Index (DPI). $\frac{\text{DPW} \times 100}{\text{PL}}$

Ocular Diameter. The maximum diameter of the eye measured across the circumocular groove or impression.

All measurements are expressed in millimetres.

DEFINITION OF THE GENUS

PLECTROCTENA F. Smith

Plectroctena F. Smith, 1858 : 101. Type-species: *Plectroctena mandibularis* F. Smith, loc. cit., by monotypy [= *Ponera caffra* Spinola, 1853 : 70 (attributed to Klug), *nomen nudum*].

Cacopone Santschi, 1914*b* : 325. Type-species: *Cacopone hastifer* Santschi, loc. cit., by monotypy. **Syn. n.**

Worker. Black, brown or reddish ponerine ants belonging to the tribe Ponerini. Monomorphic, with notable size variation in some species. Lifeway subterranean or cryptic with nest sites in the earth or in rotten wood. Size ranges from medium to very large (TL 5·6–23·5).

Mandibles elongate, linear, somewhat curved at least in the distal half, ML > 0·5 HL (measured range of MI 70–95). Mandibular blades edentate or armed with one or two teeth and with a longitudinal groove on the inner half of the dorsal surface which runs part or all the length of the blade. Mandibular articulation associated with a marked excavation of the anterior margin of the head in front of the eye. Palp formula of maxillary 3-, labial 4-segmented (dissections of *conjugata*, *cristata*, *mandibularis*, *minor*, *strigosa*) or with the labial palp 2-segmented (*subterranea*). Antennae 12-segmented. Eyes small, minute or absent; when present they are situated anterolaterally upon the head, usually on the dorsal surface and are surrounded by a circumocular groove or impression. Median portion of clypeus short, vertical, overhung by the strongly developed lobes of the frontal carinae. Dorsum of alitrunk with a single developed suture, the promesonotal. Track of metanotal groove faintly visible in individuals of some species. Propodeal declivity bordered on each side by a raised ridge or lamina which sometimes also extends across the dorsum. Femora of middle and hind legs with a mediodorsal thin strip of cuticle or a shallow groove which extends for at least the basal one-third of the length of the femur. Middle and hind tibiae each with a single pectinate spur, the lateral spur absent. Pretarsal claws simple. Petiole a node of variable shape; gaster very strongly constricted between the first and second segments.

Female. As worker but somewhat larger; either alate with fully developed flight sclerites or ergatoid. Ocelli present in alate forms, reduced or vestigial in ergatoids. Eyes larger than in workers.

The known females are discussed below.

Male. Mandibles very reduced, edentate, short, roughly rectangular in shape and apparently failing to meet apically at full closure. Palp formula of maxillary 5 or 6 segments, labial 4 segments (*mandibularis*), the apical and penultimate maxillary palpomeres fused or separate (degree of fusion is variable and may be greater in one palp than the other on the same specimen). Antennae 13-segmented, very long and filiform. Scape and first funicular segment short, their combined length equal to or less than the length of the second funicular segment. Clypeus well developed, broad. Frontal carinae strongly developed into triangular or rounded lobes which are elevated at an angle of about 45 degrees. Eyes large, ocelli well developed. Pronotum not overhung by mesoscutum in front, the latter with notauli and parapsidal furrows present. Scutellum swollen and somewhat dome-shaped and prominent in profile, commonly with a median longitudinal impression dorsally. Legs with femora lacking the mediodorsal thin strip or groove, the tibiae of the middle and hind legs each with a single pectinate spur. Pretarsal claws with a small median tooth. Hind wing with anal lobe present. Genitalia rectractile, gonopalpi present. Parameres thick and blunt, bowed outwards, curving towards one another apically. Digitus of volsella right-angled, with the apical portion thickened and equipped with numerous minute, dentiform structures on the side facing the cuspis; the latter bowed toward the digitus. Aedeagus a pair of large plates, the ventral portions of which are strongly sclerotized and serrate, the teeth recurved.

NOTES ON THE GENUS

THE FEMALES OF THE SPECIES.

Of the 16 described species females of 11 are known or are associated for the first time in this paper. Of these 11, four are ergatoid, the remainder being normal alate forms with developed flight sclerites. The species with ergatoid females include *cristata*, *dentata*, *conjugata*, and the type-species *mandibularis*; females are unknown for *anops*, *hastifer*, *laevior*, *macgeei* and *strigosa*; the rest have alate queens.

Wheeler (1922*a* : 88) described a third form of female as apterous and attributed it to *minor*. His description is very short, but from the size and colour of the individual it seems certain that his specimen is not *minor*. I have not seen the specimen but it may represent an otherwise unknown species as it is not easily applicable to any presently known form. I would not be surprised if a re-examination of this queen reveals that its wings have been lost in quite the normal manner.

Santschi (1924 : 155) stated that the female of *gestroi* is ergatoid, which is not the case, and gave *latinodis* as being apterous. I have examined the syntype and a second female of *latinodis* and find that the wings have been lost in the normal manner and that remnants of the detached forewings are visible, projecting from beneath the tegulae.

AFFINITIES OF *Plectroctena*.

Emery (1911) grouped *Plectroctena* with the genera *Trapeziopelta* Mayr , *Myopias* Roger and *Psalidomyrmex* André in a subtribe Plectroctenini of tribe Ponerini. Forel (1917) retained this arrangement and added *Cacopone* to the group as Santschi (1914*b*) had already stated that this genus was related to *Psalidomyrmex* and *Myopias*. Santschi (1924) added *Promyopias* Santschi to the list of genera in the subtribe and it has remained as such to the present day.

The characters given to link these genera were always tenuous and seemed to rest, rather uneasily, upon the fact that the members, except *Psalidomyrmex*, possessed elongate or linear mandibles. Emery (1911) characterised his subtribe by sculpturation, which is so variable amongst member-species as to be meaningless, and by the development of the lateral tibial spurs which were given as rudimentary or absent. Brown (1963) has pointed out that this character was much over-emphasized in the past but amongst the genera at present under discussion it is of use in separating them. Thus, *Trapeziopelta*, *Myopias* and *Promyopias* each have a recognizable lateral tibial spur in addition to a strongly developed median spur, whereas in the remainder this lateral spur is lacking or is indistinguishable from the surrounding setae.

Observation of the species in these genera implies that *Myopias* and *Trapeziopelta* are closely related and are derived from the *Pachycondyla-Bothroponera* complex of the tribe Ponerini, whereas the true affinities of *Promyopias* appear to lie with *Centromyrmex* as the median spurs of the middle pair of legs are reduced whilst those of the hind legs are fully developed. Also the extensor surfaces of the tibiae and basal tarsal segments of the mid legs are equipped with spines and the gaster is not constricted behind the first segment.

Of the three remaining genera, *Cacopone* is now known to be a synonym of *Plectroctena* (see note 3, below) and *Psalidomyrmex* appears as the genus most closely related to *Plectroctena*. These last two share the same form of alitrunk, node and gaster in the worker and female castes and have the same odd reduction of palpal segments, where the labial palps have more segments than the maxillaries; the most common palp formula in both genera being maxillary 3-, labial 4-segmented. The males are remarkably similar and are separated only by the absence of notauli in *Psalidomyrmex*, but in the workers and females the unique mandibular development and the presence of femoral dorsal grooves in *Plectroctena* quickly separate the genera.

The origins of both *Plectroctena* and *Psalidomyrmex* appear to lie in the genus *Bothroponera* but evidence in support of this assumption is as yet incomplete. It is, however, probably safe to say that their origins differ from those of *Myopias* and *Trapeziopelta*.

Thus the subtribe Plectroctenini is spurious, being merely an assemblage of long-mandibulate forms of tribe Ponerini placed together for the sake of convenience.

SYNONYMY OF *Plectroctena* AND *Cacopone*.

The genus *Cacopone* was founded upon a single specimen by Santschi (1914*b*) who considered it to be 'between *Psalidomyrmex* and *Myopias*'. Later, in his review of *Plectroctena*, Santschi (1924) stated that this genus was very close to *Cacopone* and separated the latter on the shape of its mandibles and the fact that 'the articulatory emargination of the anterior angle of the head (is) missing'.

This statement corresponds to the figure of *C. hastifer* given by Santschi in the original description, where no emargination is shown, but flatly contradicts the statement on lines 2–3 of the original description where the clypeus is said to be 'emarginate at the mandibular insertions'.

A specimen in the BMNH collection from Tafo, Ghana (only a short distance from the type-locality of *C. hastifer*) fits the original description perfectly and only fails to match the figure as the articulatory emarginations are well developed. It was concluded that the figure was inaccurate but had been used by Santschi as his reference point for *Cacopone* when working on his review of *Plectroctena*, as the holotype of *hastifer* was at that time no longer in his possession but had been deposited in the IE, Naples along with the rest of the Silvestri material from which it originally came.

Only the specialized shape of the mandibles remained to separate *Cacopone* from *Plectroctena* but this character, weakened by the discovery of a second, *hastifer*-like species with more normal mandibles is insufficient evidence for retaining the genus, and it is consequently relegated to the synonymy of *Plectroctena*.

LIST OF SPECIES

hastifer-group
  anops **sp. n.**
  hastifer (Santschi) **comb. n.**
minor-group
  cristata Emery
    cristata var. *semileavis* Santschi **syn. n.**
  dentata Santschi
    emeryi Santschi **syn. n.**
  gabonensis Santschi
  latinodis Santschi
  minor Emery
    minor var. *insularis* Santschi **syn. n.**
    minor var. *liberiana* Santschi **syn. n.**
    minor var. *perusta* Santschi **syn. n.**
mandibularis-group
  conjugata Santschi
  cryptica **sp. n.**
  gestroi Menozzi
  laevior Stitz **stat. n.**
  macgeei **sp. n.**
  mandibularis F. Smith
    Ponera caffra 'Klug' Spinola (*nomen nudum*)
    caffra st. *major* Forel
    mandibularis var. *integra* Santschi **syn. n.**
    mandibularis st. *strigosa* var. *strialiventris* Stitz (name not available)
  strigosa Emery **stat. n.**
  subterranea Arnold
    punctata Santschi **syn. n**
  ugandensis Menozzi

KEY TO SPECIES

(Based on worker caste)

Note: the worker of *ugandensis* is not known.

1 Apical half of each mandibular blade swollen; basal tooth absent (Text-fig. 2). Head relatively narrow, CI < 80. Propodeal laminae continuous around dorsum of declivity 2
– Apical half of each mandibular blade not swollen; basal tooth usually present (Text-fig. 3). Head relatively broad, CI > 85. Propodeal laminae if present confined to lateral portions of declivity, not continuous around the dorsum . . . 3
2 Dorsal surfaces of head, alitrunk, petiole and first gastral tergite with numerous erect hairs. Eyes present, minute. Node of petiole relatively long and low in profile, LPI <75. (Ghana) . . . . **hastifer** (p. 320)
– Dorsal surfaces of head, alitrunk, petiole and first gastral tergite without erect hairs. Eyes absent. Node of petiole relatively higher in profile, LPI >85. (Ghana) . . . . **anops** (p. 319)
3 First gastral tergite with an anteriorly located transverse groove or impression which may run the width of the tergite or may be reduced to the central one-quarter of the width of the segment 4
– First gastral tergite without a transverse groove or impression anteriorly . . 8
4 Ventral surfaces of the head and usually also the sides of the head, at least below and behind the eyes, with the spaces between punctures finely striate. Funicular segments 3–4 as long as, or longer than broad 5
– Ventral surfaces of the head and sides of head below and behind the eyes with the spaces between punctures smooth and shining. Funicular segments 3–4 broader than long, usually markedly so 6
5 Very large species, HL $>4{\cdot}0$, with relatively very long mandibles, MI >90. Ocular diameter $0{\cdot}46$ or more. (Cameroun, Zaire, Kenya) . . . . **cristata** (p. 321)
– Smaller species, HL $<4{\cdot}0$, with relatively shorter mandibles, MI <90. Ocular diameter $0{\cdot}46$ or less. (Uganda, Zaire, Angola) . . . . **dentata** (p. 322)
6 Petiole in dorsal view relatively very broad, the node about as broad as long, DPI 100. (Cameroun, Zaire). . . . . **latinodis** (p. 323)
– Petiole in dorsal view relatively narrower, the node distinctly longer than broad, DPI <85 7
7 Eyes larger, ocular diameter $>0{\cdot}30$. Full adult colour black. Petiole in dorsal view with a median impression in the posterior margin. (W. & C. Africa) **minor** (p. 324)
– Eyes smaller, ocular diameter $<0{\cdot}30$. Full adult colour deep brown or red-brown. Petiole in dorsal view usually without a median impression in the posterior margin. (Gabon, Equatorial Guinea, Zaire). . . . . . . **gabonensis** (p. 323)
8 Head very coarsely sculptured dorsally with large pits or foveolae whose diameters are greater than the distances separating them or which are adjacent. Mesonotum and propodeum with a polished, virtually unsculptured median longitudinal strip. (Liberia, Ivory Coast, Ghana) . . . . **cryptica** (p. 327)
– Head punctate dorsally, the punctures small and separated by distances greater than their diameters; punctures never adjacent. Mesonotum and propodeum without a polished, virtually unsculptured median longitudinal strip 9
9 Mandibles edentate (Text-fig. 1). Node of petiole relatively long, low and narrow, LPI <90, DPI <70. (Nigeria) . . . . **macgeei** (p. 330)
– Mandibles at least with a strongly developed basal tooth and usually also with a second, smaller tooth in the apical half (Text-fig. 3). Node of petiole relatively short, high and broad, LPI >100, DPI >75 10
10 Head and alitrunk in profile with numerous short, erect or suberect hairs projecting from the dorsum. (Principe Is.) . . . . **gestroi** (p. 328)

– Head and alitrunk in profile without hairs projecting from the dorsum . . 11

11 Ventral surfaces of head without striation between the punctures. . . . 12

– Ventral surfaces of head with striation between the punctures, at least anteroventrally . . . 13

12 Propodeal declivity armed near the base with a pair of stout triangular teeth, dorsal to which the laminae are not developed. Larger species, $HL > 3{\cdot}0$. Full adult colour black or black-brown. (Tanzania) . . . ***laevior*** (p. 329)

– Propodeal declivity not armed with teeth, the laminae running almost the length of the declivity. Smaller species, $HL < 2{\cdot}5$. Full adult colour red or orange-brown. (Ivory Coast, Kenya, Malawi, Rhodesia) . . . ***subterranea*** (p.333)

13 Leading (anterior) margin of antennal scapes with a row of freely projecting, erect, short hairs. (Kenya, Tanzania, South Africa) . . . ***strigosa*** (p. 332)

– Leading (anterior) margin of antennal scapes without freely projecting short, erect hairs . . . 14

14 Funicular segments 3–5 at least as long as broad, usually longer than broad. Larger species, $HL > 3{\cdot}0$. (S. & E. Africa, Angola, Zaire) . . . ***mandibularis*** (p. 330)

– Funicular segments 3–5 broader than long. Smaller species, $HL < 3{\cdot}0$. (Rhodesia, South Africa) . . . ***conjugata*** (p. 326)

PROVISIONAL KEY TO KNOWN FEMALES

Note: in the majority of species very few females are represented in collections; the key below should therefore be used with some caution.

1 Alate species. If wings lost then the flight sclerites are fully developed. Ventral surfaces of head with the spaces between punctures smooth and shining . . 2

– Ergatoid species. Wings absent, never developed; flight sclerites never developed; sutures of dorsal alitrunk usually reduced or absent. Ventral surfaces of head with the spaces between punctures striate. . . . 8

2 First gastral tergite with an anteriorly located transverse groove or impression. 3

– First gastral tergite without an anteriorly located transverse groove or impression 5

3 Larger, more thickset species, $HL > 3{\cdot}60$, pronotal width at maximum $> 2{\cdot}50$. 4

– Smaller, more slender species, $HL < 3{\cdot}50$, pronotal width at maximum $< 2{\cdot}40$. (Cameroun, Zaire) . . . ***latinodis*** (p. 324)

4 Full adult colour deep red-brown. Petiole relatively longer and narrower, PL 1·60, $DPI < 80$. Smaller species, $HL < 3{\cdot}70$. (Gabon, Equatorial Guinea, Zaire) ***gabonensis*** (p.323)

– Full adult colour black. Petiole relatively shorter and broader, $PL < 1{\cdot}55$, $DPI > 80$. Larger species, $HL > 3{\cdot}70$. (W. & C. Africa) . . ***minor*** (p.325)

5 Dorsal surfaces of head and alitrunk with numerous short, erect or suberect hairs. (Principe Is.) . . . ***gestroi*** (p. 329)

– Dorsal surfaces of head and alitrunk without erect or suberect hairs . . . 6

6 Dorsum of head with large punctures or foveolae whose diameters are greater than the distances separating them or which are adjacent. Head black. Smaller species, $HL < 1{\cdot}55$. (Liberia, Ivory Coast, Ghana) . . . ***cryptica*** (p. 328)

– Dorsum of head with small, fine, scattered punctures whose diameters are smaller than the distances separating them and which are never adjacent. Head red or red-brown. Larger species, $HL > 1{\cdot}75$ . . . 7

7 Antennal scapes when laid back failing to reach the level of the lateral ocelli. Smaller species with relatively low petiole, $HL < 2{\cdot}0$, $LPI < 110$. (Uganda, Zaire) . . . ***ugandensis*** (p. 334)

– Antennal scapes when laid back surpassing the level of the lateral ocelli. Larger species with relatively high petiole, $HL > 2{\cdot}0$, $LPI > 115$. (Ivory Coast, Kenya, Malawi, Rhodesia) . . . ***subterranea*** (p. 333)

8 First gastral tergite with an anteriorly located transverse groove or impression. Petiole relatively long and narrow, $\mathrm{DPI} < 85$ 9
– First gastral tergite without an anteriorly located transverse groove or impression. Petiole relatively short and broad, $\mathrm{DPI} > 90$ 10
9 Large species with large eyes, $\mathrm{HL} > 4{\cdot}55$, ocular diameter $> 0{\cdot}65$. Petiole relatively narrow dorsally, $\mathrm{DPI} < 70$. (Cameroun, Zaire, Kenya) . . . ***cristata*** (p. 322)
– Smaller species with small eyes, $\mathrm{HL} < 4{\cdot}55$, ocular diameter $< 0{\cdot}55$. Petiole relatively broad dorsally, $\mathrm{DPI} > 70$. (Uganda, Zaire, Angola) . ***dentata*** (p. 322)
10 Large species with relatively long mandibles, $\mathrm{HL} > 4{\cdot}0$, $\mathrm{SL} > 2{\cdot}90$, $\mathrm{MI} > 83$. (S. & E. Africa, Angola, Zaire) . . . . ***mandibularis*** (p. 331)
– Smaller species with relatively shorter mandibles, $\mathrm{HL} < 4{\cdot}0$, $\mathrm{SL} < 2{\cdot}80$, $\mathrm{MI} < 83$. (S. Africa, Rhodesia) . . . . ***conjugata*** (p. 326)

THE *HASTIFER*-GROUP

Basal tooth of mandible absent; apical portion of mandible swollen. Propodeal laminae forming a continuous rim around the sides and dorsum of the declivity. First gastral tergite without an anteriorly situated transverse groove or impression. Head considerably longer than broad, $\mathrm{CI} < 80$. Petiole in profile long and low, noticeably longer than high, $\mathrm{LPI} < 100$. Eyes minute or absent. Sculpturation of head of coarse punctures or foveolae, the diameters of the individual punctures greater than the distances separating them, or the punctures virtually adjacent.

The two species known in this small group have been found only in the forest zone of eastern Ghana. Both are elongate, relatively slender forms with a red or red-brown colour and with the eyes very small or lacking. In view of these characters a completely subterranean lifeway is postulated for the species.

Plectroctena anops **sp. n.**

(Text-figs 4, 7)

DIAGNOSIS OF WORKER. Eyes absent. Mandibles without a differentiated basal tooth, the apex swollen. Propodeal laminae strongly developed, continuous around the dorsum and sides of the declivity. First gastral tergite without a transverse groove anteriorly. Dorsum of head with large pits or foveolae whose diameter is greater than the distances separating them.

FURTHER DESCRIPTION. *Holotype worker.* TL 7·4, HL 1·68, HW 1·32, CI 78, ML 1·20, MI 71, SL 0·98, PH 0·72, PL 0·80, LPI 90, DPW 0·56, DPI 70.

Mandibles without a basal tooth. In dorsal view the apical halves of the mandibles swollen, broader than the basal halves; tapering towards the apex. On the inner margin of each mandibular blade, at the point where the mandibles increase in width, is a small, blunt, dentiform prominence. Eyes absent. Posterior margin of head almost straight, only very shallowly concave in full face view. General outline of head as shown in Text-fig. 4. Funicular segments 2–10 distinctly broader than long. Propodeal laminae strongly developed, broad, translucent, meeting dorsally so that the declivity is encircled on both sides and narrowly above. Femoral grooves of middle and hind legs reduced but still visible. Petiole in profile blocky and massive, slightly longer than high; in dorsal view long and narrow, gradually increasing in width from front to back. First gastral tergite rounded anteriorly in dorsal view, its width increasing posteriorly. Second tergite with sides nearly parallel, only very weakly convex and somewhat convergent posteriorly.

Dorsum, sides and ventrolateral surfaces of head densely covered with large punctures or foveolae which are contiguous or nearly so, their diameters noticeably greater than the distances separating them. Dorsal alitrunk similarly but more shallowly sculptured, the pronotal disc with the punctures more closely approximated than on the sides and similarly with the remainder of the alitrunk. Sides of alitrunk with a few weak striae between punctures. Propodeal declivity smooth and highly polished. Petiole sculptured as alitrunk. First and second gastral tergites and sternites densely covered with punctures or foveolae.

Dorsal surfaces of head, alitrunk and gaster with a diffuse, decumbent pubescence which is directed toward the mid line. Erect hairs present only on mouthparts, legs and apex of gaster.

Full adult colour red-brown.

Holotype worker, GHANA: Tafo, 8.ix.1966, ant ecology sample 249c (*D. Leston*) (BMNH).

This small species is most closely related to *hastifer*, from which it may be separated by its size, lack of eyes and absence of erect hairs from the dorsal surfaces of the head and body.

Plectroctena hastifer (Santschi) **comb. n.**

(Text-figs 2, 6)

Cacopone hastifer Santschi, 1914*b* : 325, fig. 11. Holotype worker, GHANA: Aburi (*F. Silvestri*) (IE, Naples).

DIAGNOSIS OF WORKER. Mandibles without a basal tooth, their apices swollen. Dorsal surfaces of head, alitrunk, petiole and first two gastral segments with numerous erect hairs. Anterior and dorsal surfaces of petiole confluent, meeting through a smooth curve, not separated by an angle. Dorsum of head coarsely punctate, the diameter of the punctures greater than the distance separating them. First gastral tergite without an anterior transverse groove. Propodeal laminae meeting dorsally, continuous around the declivity.

FURTHER DESCRIPTION. *Worker*. TL 10·9, HL 2·40, HW 1·84, CI 77, ML 1·68, MI 70, SL 1·48, PH 0·84, PL 1·24, LPI 68, DPW 0·64, DPI 52.

Mandibles edentate, the distal half swollen, considerably broader than the proximal, tapering apically. Head considerably longer than broad, the occipital margin virtually straight, only extremely shallowly concave. Eyes present, depigmented, very small, ocular diameter 0·10–0·12. Funicular segments 3–9 noticeably broader than long. Dorsal groove or thin strip absent from middle, present on hind femora. Propodeal laminae contiguous dorsally, translucent, forming a continuous lamella around the declivity. Node of petiole in profile long and low, the anterior and dorsal surfaces confluent through a continuous shallow curve, not separated by an angle. In dorsal view the first gastral tergite rounded anteriorly.

Sculpture everywhere of large but quite shallow punctures or foveolae whose diameters are equal to or greater than the distances separating them. The spaces between the punctures are smooth and shining except on the sides of the alitrunk and petiole, where striae are present.

Dorsal surfaces of head, alitrunk, petiole and first and second gastral tergites with numerous short, erect hairs. Full adult colouration a deep red.

Most closely related to *anops* but separable from it by the smaller size of that species and its lack of eyes or erect hairs.

MATERIAL EXAMINED.

GHANA: Tafo (*D. Leston*).

THE *MINOR*-GROUP

Basal tooth of mandible present and each blade also with a second, more apically placed tooth which is usually very small, sometimes no more than a faint prominence. Apical portion of mandible not swollen. Propodeal laminae restricted to the sides of the declivity, often very weakly developed. First gastral tergite with an anteriorly placed transverse groove or impression which is often strongly developed but which may be reduced and only clearly visible medially. Head relatively broad, the measured range of CI 89–97. Petiole in profile as high as long or higher than long, LPI 100 or more. Eyes present, usually well developed but small in some species. Dorsum of head sculptured with fine, widely spaced punctures.

This group contains five species, linked by the characters noted above. Within the group the species separate into two complexes, one based upon *minor* itself and including also *gabonensis* and *latinoda*, in which the females are alate and the ventral surfaces of the head are smooth between the punctures, and the second based upon *cristata* and *dentata* in which the females are ergatoid and the ventral surfaces of the head are striate between the punctures.

The distribution of the species of the *minor*-group is mostly restricted to the rain forests of West and Central Africa, but *cristata* and *dentata* have been found in the forests of Kenya and Uganda respectively. Eidmann (1944) reported the presence of *gabonensis* upon the island of Fernando Po in the Gulf of Guinea, the only member of this group to be found off the mainland.

For nesting sites the members of the group appear to prefer the wood of very rotten or collapsed logs and foraging is carried out under the bark and in the wood of such logs as well as under the bark of more recently dead wood.

Plectroctena cristata Emery

Plectroctena cristata Emery, 1899 : 470. Syntype workers, CAMEROUN (*Conradt*) (probably in MCSN, Genoa).

Plectroctena cristata var. *semileavis* Santschi, 1924 : 163. Holotype worker, ZAIRE: Luebo, Kamaiembi 22.ix.1921 (*H. Schouteden*) (MRAC, Tervuren) [examined]. [Variant spelling as *semilaeve* op. cit.: 173.] **Syn. n.**

DIAGNOSIS OF WORKER. Very large species, HL $>$ 4·0. First gastral tergite with a strongly marked transverse groove anteriorly. Dorsum of head often with a shallow, broad, transverse impression posteriorly which is interrupted medially. Funicular segments 3–5 longer than broad. Sides of head behind eyes with the spaces between punctures usually finely striate. Ocular diameter 0·48–0·62.

FURTHER DESCRIPTION. *Worker* TL 21·6–23·2, HL 4·40–4·60, HW 4·12–4·32, CI 93–94, ML 4·16–4·36, MI 94–95, SL 3·24–3·48, PH 2·00–2·16, PL 1·92–2·04, LPI 100–106, DPW 1·32–1·36, DPI 67–69 (5 measured).

Sides of head expanded and convex in front of the eyes. Palp formula 3, 4. Dorsal surface of head posteriorly usually with a shallow or very shallow, broad transverse impression which is interrupted medially. In some specimens this character is faint or absent. Funicular segments 3–9 at least as long as broad, usually longer than broad. Pronotal dorsum usually without, very rarely with a median longitudinal impression posteriorly. When present this character is extremely faint. Outline shape of propodeal laminae in profile variable but usually with a rounded prominence about half way down the declivity which in some may be bluntly dentiform. Anterior transverse groove of first gastral tergite strongly developed, clearly visible in profile and running almost or quite the anterior width in dorsal view.

Dorsum of head with scattered fine punctures, the interspaces shining mediodorsally and usually striate laterodorsally, but in some individuals striae are present over the entire surface. Sides of head usually, and ventral surface always, striate between the punctures. Dorsal alitrunk and first two gastral tergites usually with the interpunctural spaces smooth and shiny, more rarely with the spaces shagreened or finely striate. Lateral portions of the first tergite often striate between punctures, as are the lateral portions of the first sternite. Full adult colour black.

Female. TL 24·2, HL 4·64, HW 4·52, CI 99, ML 4·40, MI 95, SL 3·40, PH 2·16, PL 2·04, LPI 106, DPW 1·40, DPI 68.

Ergatoid. Slightly larger than the largest worker measured; ocular diameter 0·72. Ocelli present, the median more strongly developed than the laterals. Metanotal groove present. Mesoscutellum delineated upon the dorsal alitrunk. Sculpturation of head fainter and less well defined than in worker. Otherwise as worker.

This very large species is most closely related to *dentata* but is separable by the characters given in the keys.

MATERIAL EXAMINED.

CAMEROUN: no loc. (ex coll. Santschi); Ntsama (*B. de Miré*). ZAIRE: Ubangi, Binga (*H. J. Bredo*); Niapu (*H. O. Lang*). KENYA: Kibale Forest (*A. Loveridge*).

Plectroctena dentata Santschi

Plectroctena minor var. *dentata* Santschi, 1912 : 150. Syntype workers, ANGOLA: Benguela, Cucala (*J. Cruchet*) (NM, Basle; MRAC, Tervuren) [examined].

Plectroctena dentata Santschi; Santschi, 1924 : 164 fig. 1c. [Raised to species.]

Plectroctena emeryi Santschi, 1924 : 164. Holotype female (ergatoid; not worker), CONGO (*J. de Gaule*) (NM, Basle) [examined]. **Syn. n.**

DIAGNOSIS OF WORKER. First gastral tergite with a weakly developed transverse groove anteriorly. Funicular segments 3–5 about as broad as long. Ocular diameter 0·42–0·46. Ventrolateral and ventral surfaces of head with striae between the punctures.

FURTHER DESCRIPTION. *Worker.* TL 12·8–17·7, HL 3·20–3·52, HW 2·96–3·28, CI 92–94, ML 2·34–3·00, MI 75–85, SL 2·08–2·36, PH 1·36–1·52, PL 1·28–1·48, LPI 103–106, DPW 0·96–1·08, DPI 71–75 (5 measured).

Sides of head in front of eye very slightly or not expanded, forming a more or less continuous line with the remainder of the sides. Eyes of moderate size, ocular diameter 0·42–0·46. Funicular segments 3–5 about as broad as long but distal to this becoming noticeably broader, segments 7–9 obviously broader than long. Pronotal dorsum without a median longitudinal impression (but as this character is commonly developed in species of this group specimens will probably be found in which it does occur). Propodeal laminae in profile usually starting a short distance down the declivity and expanded at this point into a bluntly dentiform prominence, variable in shape and size even in members of the same nest-series. Transverse impression of first gastral tergite usually faint and poorly developed, only visible in the middle of the tergite, often scarcely discernible in profile.

Dorsum of head with fine, scattered punctures, the interspaces smooth and shining. Below the eye (and more rarely also behind it) and the ventral surfaces of the head with fine striae between the punctures. Dorsal alitrunk and first and second gastral segments smooth and shining between the punctures. Occasionally a few faint striae may be present on the propodeal dorsum.

Female. TL 22·6–23·2, HL 4·20–4·28, HW 4·08–4·12, CI 95–98, ML 3·76–3·90, MI 88–93, SL 3·08–3·12, PH 1·92–2·00, PL 1·84–1·88, LPI 104–106, DPW 1·36–1·40, DPI 72–76 (2 measured).

Ergatoid. Ocular diameter 0·48–0·50. Ocelli present or head with a pair of distinct pits marking the vestiges of the lateral ocelli. Metanotal groove present but poorly defined. Propodeal laminae not dentiform but with an angular portion at about the midlength. Groove on the first gastral tergite more strongly developed than in the worker; the striate sculpturation of the ventral surface of the head less strongly developed. Otherwise as worker.

MATERIAL EXAMINED.

UGANDA: Busia (*E. S. Ross & R. E. Leech*). ZAIRE: Kisenje (?).

Plectroctena gabonensis Santschi

Plectroctena gabonensis Santschi, 1919*a* : 336. Syntype workers, GABON: Libreville, 1.xii.1897 (*Chalot*), and GABON: Samkita 1914 (*F. Faure*) (NM, Basle) [examined].

Note: Santschi described this species twice as new; first as above and later the same year as *subterranea* st. *gabonensis* Santschi, 1919*b* : 90. Both descriptions were based upon the same specimens.

DIAGNOSIS OF WORKER. As *minor* but first gastral tergite with the transverse groove very weak, usually only plainly visible in the middle of the sclerite. Petiole in dorsal view without a median impression in the posterior margin. Eyes small, ocular diameter 0·22–0·26.

FURTHER DESCRIPTION. *Worker.* TL 12·8–14·0, HL 2·60–2·92, HW 2·32–2·68, CI 89–95, ML 2·20–2·56, MI 85–92, SL 1·60–1·92, PH 1·08–1·36, PL 1·04–1·24, LPI 100–109, DPW 0·76–0·92, DPI 73–75 (8 measured).

As *minor* but averaging slightly smaller than that species. The eyes are noticeably smaller, with a maximum ocular diameter of 0·26 (compared to a minimum ocular diameter of 0·32 in *minor*). Propodeal laminae very poorly developed, scarcely more than a pair of weak ridges, not projecting as bluntly dentiform prominences. In dorsal view the posterior margin of the node usually lacks a median impression. The transverse groove on the first gastral tergite is very weak indeed; in some specimens only a faint impression in the middle of the sclerite is visible and this impression is only poorly defined in profile. Full adult colour is deep red-brown, as opposed to black or black-brown in *minor*.

Female. A fully alate queen in MCZ, Cambridge is suspected as the female of this species. It resembles the worker but is larger, with fully developed flight sclerites and ocelli. Its dimensions are TL 19·6, HL 3·68, HW 3·48, CI 94, ML 3·04, MI 83, SL 2·60, PH 1·64, PL 1·60, LPI 103, DPW 1·20, DPI 75.

MATERIAL EXAMINED.

GABON: no loc. (ex coll. F. Smith). EQUATORIAL GUINEA: Fernando Po (*Conradt*). ZAIRE: Tshela (*E. S. Ross & R. E. Leech*); Eala (*J. Ghesquière*); Uele, Buta (*R. F. Hutsebaut*); Equateur, Bokuma (*R. P. Hulstaert*).

Plectroctena latinodis Santschi

Plectroctena latinodis Santschi, 1924 : 165, fig. 2a. Syntype worker, female, ZAIRE: Congo da Lemba (*R. Mayné*) (MRAC, Tervuren, NM, Basle) [examined].

DIAGNOSIS OF WORKER. As *minor* but the petiole relatively higher, LPI 115, and considerably broader, DPI 100. Transverse groove on first gastral tergite developed only in the middle of the sclerite and situated at the extreme anterior margin.

FURTHER DESCRIPTION. *Worker.* TL 15·6, HL 3·16, HW 2·92, CI 92, ML 2·72, MI 86, SL 2·08, PH 1·20, PL 1·04, LPI 115, DPW 1·04, DPI 100.

As *minor*, but *latinodis* is slightly smaller and its ocular diameter is at the bottom of the size range seen in *minor* workers (0·32). Propodeal laminae very poorly developed, scarcely more than a pair of weakly raised ridges. Transverse groove of first gastral tergite strongly developed in the median portion of the sclerite only, and is very close to the anterior border of the tergite. The shape of the petiole node is immediately diagnostic of the species. In profile it is high and narrow, lacking the impression or discontinuity of outline in the anterodorsal margin which is seen in *minor* and usually also in other related species. In dorsal view the node is blocky and broad, with a DPI in the syntype worker of 100, compared to the maximum recorded DPI of 76 in workers of other species of the group.

Female. TL 18·0–18·2, HL 3·28–3·40, HW 3·04–3·12, CI 91–93, ML 2·68–2·72, MI 79–83, SL 2·12–2·24, PH 1·48–1·52, PL 1·40–1·44, LPI 104–109, DPW 1·12–1·16, DPI 78–83 (2 measured).

Alate, the alitrunk with developed flight sclerites. Ocelli present, the median and laterals of approximately equal size. Ocular diameter 0·56–0·58. Petiole not nearly so high and broad as in worker. Otherwise as worker.

The female approximates much more closely to *minor* and *gabonensis* than the worker but is smaller and more slenderly built. The maximum width of the pronotum in specimens measured has a range 2·20–2·32 as opposed to a minimum pronotal width of 2·64 in the other two species.

MATERIAL EXAMINED.

CAMEROUN: Mundame (*Conradt*).

Plectroctena minor Emery

(Text-figs 3, 9)

Plectroctena minor Emery, 1891 : 556, pl. 15, figs 1, 2. Holotype female, IVORY COAST: Assinie, vii–viii. 1886 (*Ch. Alluaud*) (probably in MCSN, Genoa).

Plectroctena minor var. *perusta* Santschi, 1924: 168, fig. 2b. Syntype workers, CAMEROUN: Barumbistation (*Preuss*) (NM, Basle) [examined]. **Syn. n.**

Plectroctena minor var. *liberiana* Santschi, 1924 : 169, fig. 2c. Holotype worker, LIBERIA (NM, Basle) [examined]. **Syn. n.**

Plectroctena minor var. *insularis* Santschi, 1924 : 169, fig. 3a. Holotype worker, EQUATORIAL GUINEA: Fernando Po (*Conradt*) (probably in MCSN, Genoa). **Syn. n.**

DIAGNOSIS OF WORKER. First gastral tergite with a strongly marked transverse groove anteriorly. Sides of head behind and below eyes without striae between the punctures. Petiole in dorsal view usually with a weak median impression in the posterior margin. Ocular diameter 0·32–0·36. Funicular segments 3–5 broader than long. LPI $<$ 115, DPI $<$ 90.

FURTHER DESCRIPTION. *Worker.* TL 15·2–17·6, HL 3·32–3·60, HW 3·12–3·33, CI 89–97, ML 2·84–3·28, MI 85–88, SL 2·32–2·48, PH 1·36–1·48, PL 1·24–1·40, LPI 100–112, DPW 0·92–1·00, DPI 69–76 (10 measured).

Sides of head in front of eyes somewhat expanded, the outer margins convex. Palp formula 3, 4. Eyes of moderate size, measured range of ocular diameter 0·32–0·36. Funicular segments 3–10 noticeably broader than long. Pronotum with or without a median longitudinal impression. In some populations this character is distinct, in others faint, but very often absent. Propodeal laminae usually only weakly developed, most commonly with a low, dentiform prominence or angle at about one-third the distance down the declivity. Node of petiole in profile often with a slight impression or discontinuity of outline in the anterodorsal surface; and in dorsal view with a slight impression in the middle of the posterior margin. Transverse groove on first gastral tergite strongly developed, clearly visible both in dorsal view and in profile.

Dorsum, sides and ventral surfaces of head with fine scattered punctures, the spaces between which are smooth and shining, not striate. Dorsum of alitrunk and first and second gastral tergites and sternites with similar sculpture. Full adult colour black or black-brown.

Female. TL 19·2–21·4, HL 3·72–3·84, HW 3·28–3·60, CI 88–94, ML 3·12–3·20, MI 82–83, SL 2·48–2·64, PH 1·64–1·76, PL 1·46–1·48, LPI 110–119, DPW 1·20–1·24, DPI 81–84 (3 measured).

Alate, flight sclerites developed. Eyes larger, ocular diameter 0·62–0·68. Ocelli present. Otherwise as worker.

This species is not uncommon in eastern Ghana and western Nigeria and is usually found in quite dense forest or woodland in which there is an abundance of fallen and rotting wood. The majority of collections of this species made by the author were in or under rotten logs, a preference apparently being shown for logs which still retained some bark in a loose condition. Nests on the other hand appear primarily to be built in extremely rotten or collapsed logs and on one occasion a single dealate female was found in a portion of fallen and rotting carton nest of a *Crematogaster* species. Fragments of millepedes were found amongst the detritus of a nest excavated at Gambari, Nigeria, indicating that diplopods make up at least a part of the diet of *minor*.

MATERIAL EXAMINED.

SIERRA LEONE: no loc. (ex coll. F. Smith). GHANA: Tafo (*B. Bolton*). NIGERIA: Gambari (*B. Bolton*). ZAIRE: Tonolu (*H. Schouteden*): Stanleyville (*H. Kohl*); Pweto (*E. S. Ross & R. E. Leech*).

THE *MANDIBULARIS*-GROUP

Basal tooth of mandible usually strongly developed (absent in *macgeei*), the apical portion of the mandible not swollen. Propodeal laminae restricted to sides of declivity, often weakly developed. First gastral tergite without a transverse groove or impression anteriorly. Head relatively broad, measured range of CI 86–95. Petiole in profile as high as or higher than long (LPI 100 or more) except in *macgeei* (LPI 89). Eyes present, usually well developed but small in some species. Sculpture variable amongst members of the group.

This group of nine species separates into two complexes and a solitary, rather aberrant species which in many respects differs from all the others included. The first complex includes *mandibularis*, *conjugata*, *strigosa*, *laevior* and *gestroi* which are large, black species, and the second includes *subterranea*, *ugandensis* and *cryptica* which are smaller, red or red-brown species.

The anomalous *macgeei* stands out sharply from this assemblage as it is small (about the same size as the larger *subterranea* specimens) but black in colour, and possesses edentate mandibular blades and a relatively long, low and narrow petiole node.

The most widely distributed species of the group, and also of the genus as a whole, is *mandibularis*, which is known throughout southern and eastern Africa (reaching as far north as Ethiopia) and which also occurs in parts of Zaire and Angola.

Compared with this the known ranges of the other species are small indeed. *Conjugata* is known from South Africa and Rhodesia, *laevior* from Tanzania, *ugandensis* from Uganda and Zaire, and *cryptica* from a number of West African countries. Of the remaining species, *macgeei* and *gestroi* have been recorded by their type-localities only, namely Nigeria and Principe Island.

The known range of *subterranea*, from Malawi, Rhodesia and the savannah of Ivory Coast, suggests that this species is present throughout much of the savannah regions of Africa, but as its habits are probably wholly subterranean it will be a long time before its true distribution can be ascertained.

Nesting sites of the representatives of this group are terrestrial in most species, the nests being built in the earth either directly or under a stone or log.

Plectroctena conjugata Santschi

Plectroctena minor st. *conjugata* Santschi, 1914*a* : 8. Syntype workers, female, SOUTH AFRICA: Natal, Stamford Hill, Charlestown 30.iv.1905, and Zululand (*I. Trägårdh*) (MCZ, Cambridge; MRAC, Tervuren; NM, Basle) [examined].

Plectroctena conjugata Santschi; Santschi, 1924 : 166. [Raised to species.]

DIAGNOSIS OF WORKER. As *mandibularis* but smaller, HL $<$3·00; ocular diameter 0·32–0·38. Funicular segments 3–5 broader than long.

FURTHER DESCRIPTION. *Worker*. TL 11·8–14·6, HL 2·68–2·96, HW 2·48–2·72, CI 89–92, ML 2·16–2·44, MI 80–83, SL 1·88–2·04, PH 1·24–1·48, PL 1·04–1·28, LPI 109–119, DPW 0·96–1·12, DPI 80–92 (10 measured).

As *mandibularis* but averaging smaller in size and with somewhat smaller eyes. Funicular segments 3–5 usually noticeably broader than long but in some specimens only slightly so. Palp formula 3, 4. Striae on the ventral surfaces of the head less strongly developed than is usual in *mandibularis*, commonly restricted to the anterior half or one-third of the ventrolateral surfaces. A median longitudinal groove is often present on the pronotum but specimens in which it is weakly developed or absent are frequently found. Sculpturation in the species is subject to the same variation as is noted in *mandibularis* but forms with either the dorsal head or dorsal gaster striate are not known, nor are individuals showing a predominantly striate sculpture everywhere.

Female. TL 17·6–19·4, HL 3·20–3·80, HW 3·08–3·56, CI 93–96, ML 2·60–3·00, MI 79–81, SL 2·28–2·60, PH 1·48–1·84, PL 1·36–1·60, LPI 109–115, DPW 1·32–1·52, DPI 95–97 (3 measured).

Ergatoid; sutures of alitrunk reduced, developed flight sclerites lacking. Larger and more stockily built than the worker, with larger eyes, ocular diameter 0·48–0·60. Ocelli absent in specimens examined but ocellar vestiges in the form of a pair of strong pits are present on the head at the site of the lateral ocelli. Petiole relatively shorter and broader than in the worker. Otherwise as worker.

On characters shown by the worker alone, *conjugata* is not easily separated from *mandibularis* and I am not convinced that the two actually represent distinct species. Santschi (1924) separated them in his key on the character of relative length and thickness of the funicular segments, on the grounds that in *conjugata* these segments were broader than long whilst in *mandibularis* they were longer than broad. In both the collections of BMNH and MCZ, Boston, however, are specimens of *mandibularis* in which the funicular segments are only just as long as broad and it is not difficult to envisage all the known forms as being expressions of the same species.

Turning to the female one apparently has a number of mensurable characters which separate the two quite well (see key to females) but as so few specimens are available such differences may prove to be illusory when the queen castes are better known.

The male of *conjugata* is known (Santschi, 1924) and shows a striking difference from that of *mandibularis* in that the gaster of the former is black whilst that of the latter is red or orange-brown. Numerous collections of the male of *mandibularis* have been made and all have the contrasting gastral colour. Unfortunately only three collections of *conjugata* male are known and so the usefulness of this character cannot be estimated at present.

Obviously then, the question of whether *conjugata* is a distinct species cannot be settled satisfactorily at present, and a decision must await the amassing of more specimens of all three castes.

Dr W. L. Brown Jr informs me that the food of *conjugata* in South Africa consists of millepedes, and that their rubbish heaps contain many cleaned out ring-segments of these arthropods.

MATERIAL EXAMINED.

RHODESIA: Umtali, Cecil Kop (*W. L. Brown*); Vumba Mts. (*G. Arnold*). SOUTH AFRICA: Grahamstown, Howisons Poort (*W. L. Brown*); W. Grahamstown (*W. L. Brown*); Grahamstown (*F. Jacot-Guillarmod*); Grahamstown (*J. Hewitt*); Port Elizabeth (*H. Brauns*); Gomodimo (*Vernay-Lang*); Natal (ex coll. Santschi); Natal, Isipingo (*H. B. Marley*); Natal, Sydenham (*H. B. Marley*).

Plectroctena cryptica sp. n.

(Text-fig. 5)

DIAGNOSIS OF WORKER. Head coarsely punctate, the diameter of the punctures greater than the distance separating them. Dorsal alitrunk with similar but more widely spaced and fainter punctures, the mesonotum and propodeum with a narrow, polished, virtually unsculptured median strip. First gastral tergite without a transverse anterior groove. Sparse, decumbent pubescence on head pointing towards the midline.

FURTHER DESCRIPTION. *Holotype worker.* TL 6·9, HL 1·40, HW 1·20, CI 86, ML 1·00, MI 71, SL 0·84, PH 0·72, PL 0·64, LPI 112, DPW 0·60, DPI 94.

Mandibles with dentition very reduced. Basal tooth reduced to an angle, best seen in dorsolateral view, the remainder of the mandible edentate. Eyes minute, ocular diameter about 0·08. Occipital margin of head virtually straight in full-face view, only extremely weakly concave. Funicular segments 2–9 distinctly broader than long. Propodeal laminae strongly developed, extending the length of the declivity, not produced into dentiform prominences. Petiole in profile blocky, higher than long, the dorsal surface shallowly convex. Anterior face of petiole in profile sloping, virtually straight, the posterior face shallowly convex. In dorsal view the petiole is narrowest in front and strongly broadened behind, the posterior border shallowly concave. First gastral tergite without a transverse groove anteriorly.

Dorsum, sides and ventral surfaces of head coarsely and closely punctured, the diameter of the punctures as great as or greater than the distances separating them. Dorsum of alitrunk with similar but more widely spaced and shallower punctures and with an unsculptured, shining median strip running the length of the mesonotum and propodeum. Rest of body punctate, the spaces between punctures smooth and shining except on the sides of the alitrunk and petiole where striae are present. Striae strongest on metapleuron and sides of propodeum, where the punctures are almost effaced.

Erect hairs present only on mouthparts and gastral apex but a scattered decumbent pubescence is present on head, alitrunk and gaster, pointing towards the mid line on the head. Full adult colour deep red-brown.

Paratypes as holotype but smaller, size range TL 5·7–6·1, HL 1·14–1·24, HW 0·96–1·04, CI 84–85, ML 0·74–0·86, MI 65–69, SL 0·64–0·68, PH 0·62–0·68, PL 0·54–0·58, LPI 115–117, DPW 0·48–0·56, DPI 88–96 (3 measured).

The mandibles show the development of a minute, weak, angular tooth in the apical half of their length, absent from the holotype, and also have a few weak punctures at the posterior end of the polished median strip of cuticle on the propodeum. Ocular diameter shows a range of 0·06–0·08.

Holotype worker, GHANA: Tafo, 2.i.1969, on mud below dam (*B. Bolton*) (BMNH).

Paratypes. 3 workers, IVORY COAST: Lamto (Toumodi), 11.iv.1968 (sample AA 279 N2), 20.vi.1968 (sample AA 334 N4), and 21.ii.1969 (*J. Lévieux*) (BMNH; MCZ, Cambridge).

The holotype worker was found walking on a patch of muddy soil on the bank of the overflow stream of the dam at Tafo. The embankment of the stream immediately above the spot was in process of being excavated and it is assumed that this ant originated in the soil of the embankment.

This small species, the smallest known in the genus at present, is easily recognisable by its size and by the characters given in the diagnosis. The most closely related species appears to be *subterranea* as the form of the petiole node is similar in the two.

Putative female. TL 7·8, HL 1·46, HW 1·32, CI 90, ML 1·02, MI 70, SL 0·88, PH 0·76, PL 0·70, LPI 108, DPW 0·64, DPI 91.

Alate, flight sclerites fully developed. Eyes large for so small a species, ocular diameter 0·32. Ocelli present. Occipital margin broadly concave. Propodeal laminae narrow, alitrunk without a polished, unsculptured median strip. Head black, the remainder of the body brown or brown-black, with areas of differing colour upon the alitrunk. Otherwise as worker.

I have tentatively associated this female from Monrovia, Liberia (in MCZ, Cambridge) with the workers of *cryptica*. The two are very similar and only the minor differences given above separate them. Most of these differences are due to caste, and perhaps the variation in colour and sculpturation can also be attributed to this cause.

Plectroctena gestroi Menozzi

Plectroctena gestroi Menozzi, 1922 : 348, fig. 1. Syntype workers, female, PRINCIPE IS.: Roca Infante Don Enrique, iii. 1900 (*L. Fea*) (IE, Bologna; MCZ, Cambridge) [examined]. (Syntype worker from MCZ, Cambridge lacks head).

DIAGNOSIS OF WORKER. Dorsal surfaces of head, alitrunk, petiole and first gastral tergite with numerous short, erect or suberect hairs.

FURTHER DESCRIPTION. Worker. TL 14·5, HL 3·00, HW 2·84, CI 94, ML 2·56, MI 85, SL 2·40, PH 1·36–1·48, PL 1·24, LPI 110–119, DPW 1·00, DPI 80–81 (2 measured).

Basal tooth of mandible strongly developed. Eyes small, ocular diameter 0·32. Funicular segments 3–6 broader than long. Resembling *conjugata* but differing from that species by the presence of numerous short, erect or suberect hairs on the dorsal and lateral surfaces of the head and body. The middle and hind femora of *gestroi* have a number of projecting hairs ventrally, most conspicuous basally, which contrast to the short, reclinate hairs seen in this position in *conjugata*. Punctures of the cephalic dorsum are coarser and somewhat more closely spaced than in *conjugata* and the ventral surface of the head lacks striation between the punctures.

Female. TL 16·2, HL 3·20, HW 3·12, CI 97, ML 2·72, MI 85, SL 2·24, PH 1·52, PL 1·36, LPI 112, DPW 1·16, DPI 85.

As worker but alitrunk with full complement of flight sclerites. Ocelli present; ocular diameter 0·58. Dorsum of head coarsely and irregularly punctate. Punctures of the ventral surfaces of the head with the interspaces smooth and shining. Gastral tergites finely and densely punctate, the sternites rather more coarsely so, with smooth, shining interspaces. Hairs of head, alitrunk and gaster relatively shorter and more reclinate than in worker. Sides of head in full-face view with numerous hairs projecting freely beyond the margins, directed anteriorly. Projecting hairs on the ventral surfaces of the femora longer and more strongly developed than in the worker.

This easily identifiable species is at present the only member of the genus recorded from Principe Is. As far as can be ascertained it is not yet known from the mainland, though I suspect that it will eventually be found in Central Africa.

Plectroctena laevior Stitz **stat. n.**

Plectroctena mandibularis st. *laevior* Stitz, *in* Santschi, 1924 : 163, fig. 1d. Holotype worker, TANZANIA: Kiwugebiet (*Kadt*) (MNHU, Berlin) [examined].

DIAGNOSIS OF WORKER. Propodeal declivity armed with a pair of stout triangular teeth near the base. Median portion of declivity below level of teeth transversely convex. Ventral surfaces of head without striae. First gastral tergite without a transverse groove anteriorly.

FURTHER DESCRIPTION. Worker. TL 18·3, HL 3·68, HW 3·44, CI 93, ML 3·28, MI 89, SL 2·56, PH 1·76, PL 1·56, LPI 113, DPW 1·36, DPI 87.

Basal tooth of mandible strongly developed, the more distal merely a low, rounded swelling. Ocular diameter 0·44. Funicular segments 3–5 about as broad as long. Sides of head only weakly expanded in front of eye, the occipital margin strongly concave medially. Propodeal declivity armed near the base with a pair of broad, triangular teeth, situated above the strongly developed metapleural lobes. Dorsal to the teeth the propodeal laminae are not developed and only a weak margination separates the declivity from the sides. The basal portion of the declivity between the level of the spines and the metapleural lobes is transversely convex and swollen medially and this swollen portion is flanked by a pair of large, deep pits which are almost circular. In other related species these pits are reduced or absent or are situated in each side of a transverse groove at the base of the declivity. Dorsal outline of petiole in profile with a continuous convexity, without an anterior interruption in the outline.

Dorsum of head with fine, scattered, small punctures, the interspaces smooth and shining. Ventral surfaces of head similarly sculptured, as are the dorsal surfaces of the alitrunk, petiole and gaster. On the sides of the alitrunk striation is present, weakest on the pronotum, strongest on the metapleuron. First gastral tergite for the most part smooth between the punctures, but in places with a few weak, scratch-like striae.

This species is related to *mandibularis* and *conjugata* but is immediately separable from them by the unique structure of the propodeal declivity and the absence of striae on the ventral surfaces of the head. It is apparently known only from the type-collection consisting of a single specimen.

Plectroctena macgeei sp. n.

(Text-figs 1, 8)

DIAGNOSIS OF WORKER. Mandibles edentate. First gastral tergite without a transverse groove anteriorly. Ventral surface of head without striae. Node of petiole relatively long and low, LPI $<$ 100.

FURTHER DESCRIPTION. *Holotype worker*. TL 10·8, HL 2·24, HW 2·00, CI 89, ML 1·84, MI 82, SL 1·44, PH 0·92, PL 1·04, LPI 89, DPW 0·64, DPI 67.

Internal margins of mandibles without teeth. Eyes of moderate size, ocular diameter 0·24. Funicular segments 3–9 distinctly broader than long. Propodeal laminae developed on basal half of declivity, relatively broad, broadest dorsally where they are bluntly rounded. Node of petiole in profile relatively long and low, its dorsal surface a shallow, uninterrupted convexity. In dorsal view the node long and narrow, broadening posteriorly; the posterior margin with a median impression. First gastral tergite without a transverse groove anteriorly.

All surfaces of body with numerous small, scattered punctures whose diameters are smaller than the distances separating them. The spaces between punctures smooth and shining except on the sides of the alitrunk and petiole where striae are present in the interspaces. Hairs absent except on mouthparts and gastral apex, and on the legs where they are mostly spiniform. Adult colour black with legs and antennal scapes deep red-brown.

Holotype worker, NIGERIA: Gambari (Western State), 28.x.1969, amongst termites under log (*B. Bolton*) (BMNH).

This small species can immediately be distinguished from related forms by the combination of characters noted above in the diagnosis.

The worker captured (holotype) was walking along a U-shaped sunken path in the soil immediately below a wet-rotten, termite infested log. The nest could not be found.

Plectroctena mandibularis F. Smith

Plectroctena mandibularis F. Smith, 1858 : 101, pl. 7, figs 1–5. Syntype female (ergatoid), male, SOUTH AFRICA: Natal, Durban (= Port Natal) (*Gueinzius*) (BMNH) [examined].

Ponera caffra Spinola, 1853 : 70 (attributed to Klug). [*Nomen nudum.* Synonymy by Roger, 1861 : 41.]

Plectroctena caffra st. *major* Forel, 1894 : 74. Holotype female (ergatoid; not worker), MOZAMBIQUE: Delagoa (*P. Berthoud*). [Synonymy by Emery, 1899 : 469.]

Plectroctena mandibularis var. *integra* Santschi, 1924 : 161. Syntype worker, KENYA: Nairobi, Wa Kikongo et Masai, 1904 (*Ch. Alluaud*); and syntype male, KENYA: Bura, Wa Taita, 1904 (*Ch. Alluaud*) (NM, Basle) [examined]. **Syn. n.**

Plectroctena mandibularis st. *strigosa* var. *strialiventris* Stitz, *in* Santschi, 1924 : 162, fig. 1b. Holotype worker, MALAWI: Lake Tanganyika (*Reichard*) (MNHU, Berlin) [examined]. [Name not available. Variant spellings are *strativentris* and *striativentris*, loc. cit.]

Note on *mandibularis* types. In the original description of the species Smith gave the types as a worker and a male, but later stated that the worker was not known and that the sexes were 'taken in coitu by Herr Gueinzius', thus implying that the types were a female and a male. Emery (1899 : 469) pointed out this contradiction and said that in his opinion the type under discussion was a worker as it did not appear to have ocelli. However, an examination of the type shows a pair of impressions to be present at the sites of the lateral ocelli and it is concluded that this specimen is in fact an ergatoid female.

DIAGNOSIS OF WORKER. Funicular segments 3–5 at least as long as broad, usually distinctly longer than broad. Ocular diameter 0·38–0·52. First gastral tergite without a transverse groove anteriorly. At least the ventral surface of the head with striae between the punctures; striation often present elsewhere on the head and body. Large species, HL > 3·0.

FURTHER DESCRIPTION. *Worker.* TL 15·5–24·1, HL 3·12–4·64, HW 2·88–4·28, CI 89–96, ML 2·48–4·12, MI 79–93, SL 2·16–3·40, PH 1·44–2·24, PL 1·28–2·04, LPI 102–120, DPW 1·68–1·76, DPI 80–90 (25 measured).

Basal tooth of mandible strongly developed. Palp formula 3, 4. Eyes large, ocular diameter 0·38–0·52. Funiculus with the second segment longer than broad, segments 3–5 usually longer than broad but quite commonly about as long as broad. Erect hairs absent from leading edge of scape. Propodeal laminae narrow or merely a pair of low ridges, never produced into teeth or spines. Pronotum often with a median longitudinal impression; in some specimens this is very weakly developed but only rarely completely absent. Petiole in profile commonly with a slight concavity or discontinuity of outline anteriorly on the dorsal surface. First gastral tergite without an anteriorly situated transverse groove or impression.

Sculpture very variable. Ventral surfaces of head and sides of alitrunk always with striae; striation usually also present upon the first and second gastral sternites. Head usually smooth and shining with scattered punctures dorsally but specimens are known in which the sides or the sides and dorsum are striate. Linking forms include individuals with the sides strongly, the dorsum weakly striate, and forms in which the median portion of the dorsum is smooth but the remainder striate. In a single specimen from Zambia only the anterior half of the dorsal head has striae. Dorsal alitrunk usually with striation, at least in part; forms with non-striate alitrunk are rare but are known from Natal. Dorsum of first and second gastral tergites range from smooth with scattered punctures to completely striate. Individuals are known in which the striation is very weak or is present on only one tergite or only on part of the tergite, and direction of gastral striation is subject to considerable variation in direction.

Female. TL 23·6–26·2, HL 4·20–4·68, HW 4·20–4·60, CI 98–100, ML 3·68–4·36, MI 87–93, SL 3·00–3·56, PH 2·20–2·36, PL 1·88–2·08, LPI 113–120, DPW 1·92–2·04, DPI 98–102 (5 measured).

Ergatoid, flight sclerites lacking but in some individuals vestiges of suture lines are visible in places. Very similar to largest workers but eyes larger, ocular diameter 0·64–0·72, and usually lateral ocellar vestiges are present in the form of a pair of pits, which are distinctly larger and deeper than the sculptural pits.

This species is the most commonly collected member of the genus and is also one of the most variable as regards sculpturation. It has a very wide range, being known from countries of southern and eastern Africa from the Cape to Ethiopia, and occurs also in Angola and Zaire. It is very closely related to *conjugata* and a discussion of its separation is given under that species.

Arnold (1915) described the nests as follows 'The entrances to the nests are generally indicated by large heaps of earth. The chambers are placed deep below the surface, seldom less than two feet, and the number of individuals seldom exceeds 50.' He adds that the food of the species consists chiefly of millepedes and beetles but also includes termites.

MATERIAL EXAMINED.

ETHIOPIA: Higo Samula (*R. J. Stordy*); Maraquo (*O. Kovacs*). UGANDA: Ansonga (*H. Johnston*). KENYA: Mombasa (*Fernique*); Riv. Tchania (*Alluaud & Jeannel*); Diani Beach (*F. X. Williams*); nr Mombasa (*F. X. Williams*); Kisumi (?). TANZANIA: Usangu distr. (*S. A. Neave*); Zanzibar (*C. Cooke*). MALAWI: Lingadzi (*W. A.*

Lamborn); no loc. (*R. C. Wood*). ZAMBIA: Broken Hill (*Silverlock*). RHODESIA: Bulawayo (*G. Arnold*); Salisbury (*G. A. K. Marshall*); Lonely Mines (*H. Swale*); Matabeleland (*J. S. Jameson*); Wankie Nat. Park (*W. L. Brown*); Bulawayo (*W. S. Brooks*); Pretoria, Magalieskraal (*Lingnau*). BOTSWANA: Ghanzi (*J. Maurice*). MOZAMBIQUE: Gaza (*D. Odendaal*); Vallée du Revoue d'Anorada (*G. Vasse*). SOUTH AFRICA: Transvaal, Zoutpansberg (*J. P. Cregoe*); Transvaal, Shiluvane (*Junod*); Gomodimo (*Vernay-Lang*); Orange Riv. (*G. B. Hamilton*); Natal (ex coll. F. Smith); Natal, Estcourt (*E. J. Turner*); Natal (*Wroughton*); Pondoland, Port St. John (*R. E. Turner*); Pt. Elizabeth (?); Willowmore (*H. Brauns*); Cape Prov., Somerset East (*R. E. Turner*); Pretoria (*Von Sassighim*); Algoa Bay (*H. Brauns*); Zululand (*I. Trägårdh*). ANGOLA: Bruco (*P. M. Hammond*). ZAIRE: Katanga (*Lemaire*); Katanga, Vallée de la Lubumbashi (*Buttgenbach*); Kapiri (*L. Charliers*); Vallée Lukuga (*Schwetz*); no loc. (*Dybowski*); Kapona (*E. S. Ross & R. E. Leech*); Rutshuru (*E. S. Ross & R. E. Leech*); Lualaba Riv., Bukama (*J. C. Bradley*).

Plectroctena strigosa Emery **stat. n.**

Plectroctena mandibularis var. *strigosa* Emery, 1899 : 469. Holotype worker, SOUTH AFRICA: Natal (*Staudinger & Bang-Haas*) (probably in MCSN, Genoa).

DIAGNOSIS OF WORKER. Similar to *mandibularis* but leading edges of antennal scapes with a row of short, erect, freely projecting hairs. Entire dorsum of head, alitrunk and gaster very densely, finely and closely striate.

FURTHER DESCRIPTION. Worker. TL 15·4–20·1, HL 3·40–4·08, HW 3·00–3·64, CI 87–90, ML 2·80–3·60, MI 79–89, SL 2·60–3·24, PH 1·60–1·84, PL 1·40–1·68, LPI 102–114, DPW 1·08–1·28, DPI 71–77 (10 measured).

Closely related to *mandibularis* and mostly matching the characters of that species, but differing as follows. Funicular segments 3–5 always notably longer than broad. Petiole tending to be somewhat narrower in dorsal view, compare DPI above with that of *mandibularis*, DPI 80–90. Leading (anterior) margin of antennal scapes with freely projecting, erect, short hairs, absent in *mandibularis*. Ventral margins of femora with numerous long, erect, freely projecting hairs. Punctate sculpturation everywhere on head and body secondary to a very fine, dense, usually longitudinal striation which gives the species a matt black appearance to the naked eye. In *mandibularis* the head and gaster are usually shiny black.

Despite the above-listed characters I am not wholly convinced that *strigosa* is a valid species, as *mandibularis* is very variable throughout its wide range. However, shortage of *strigosa* material at the present time and the lack of linking forms between it and *mandibularis* preclude a more detailed investigation. For the present, therefore, it appears best to grant specific status to *strigosa* until sufficient material can be accumulated to decide whether it is deserving of this status or is merely an extreme geographical variant of *mandibularis*.

MATERIAL EXAMINED.

KENYA: Diani Beach (*F. X. Williams*); Mombasa (*F. X. Williams*); Mombasa (*G. M. Allen & G. Brooks*); Diani Beach (*N. L. H. Krauss*); Mombasa, Kilindini (*L. F. Brown*). TANZANIA: Morogora (*A. Loveridge*).

Plectroctena subterranea Arnold

Plectroctena subterranea Arnold, 1915 : 84, pl. 3, figs 23, 23a. Syntype workers, female, RHODESIA: Bulawayo 14.vi.1913 (*G. Arnold*); and Shiloh (*G. Arnold*) (BMNH) [examined].
Myopias subterranea (Arnold); Wheeler, 1922*a* : 87; 1922*b*: 785.
Plectroctena subterranea Arnold; Santschi, 1924 : 157, 171.
Plectroctena punctatus Santschi, 1924 : 170. Holotype male, KENYA: Bura Wa Taita, iii. 1912, 1050 m, st. 61 (*Alluaud & Jeannel*) (NM, Basle) [examined]. **Syn. n.**

DIAGNOSIS OF WORKER. Funicular segments 3–5 broader than long. Ocular diameter 0·14–0·20. Labial palp with 2 segments. Head without striae. Full adult colour red-brown.

FURTHER DESCRIPTION. *Worker*. TL, 7·6–10·8 HL 1·60–2·20 HW 1·40–1·96, CI 86–89, ML 1·28–1·76, MI 75–80, SL 0·96–1·24, PH 0·72–1·04, PL 0·68–0·88, LPI 109–128, DPW 0·56–0·80, DPI 82–94 (6 measured).

Basal tooth of mandible well developed but the distal tooth represented only by a slightly raised angle. Funicular segments 3–9 distinctly broader than long. Labial palp 2-segmented (single worker dissected). Eyes small, ocular diameter 0·20 at maximum. Occipital margin feebly concave in full-face view, more strongly so in larger than in smaller workers. Propodeal laminae developed but without dentiform prominences. Petiole with dorsal surface uninterrupted in profile by an anterior depression or discontinuity of outline; the dorsal surface with a feeble anterior-posterior slope. In dorsal view the petiole short and broad, only slightly broader behind than in front, and with the posterior surface weakly concave. First gastral tergite without a transverse groove or impression anteriorly.

All dorsal surfaces, sides and ventre of head and gastral sternites with numerous small, fine, widely separated punctures, the spaces between which are smooth and highly polished. Sides of alitrunk and petiole with striae; the striae on the meso- and metapleurae and the sides of the propodeum so dense as to obscure the puncturation, considerably less dense or absent on part or all the sides of the pronotum.

Female. TL 11·8, HL 2·52, HW 2·24, CI 89, ML 1·92, MI 76, SL 1·44, PH 1·28, PL 1·04, LPI 123, DPW 0·92, DPI 88.

Alate, flight sclerites fully developed. Ocular diameter 0·36; ocelli present. Otherwise as worker.

This species was formerly known only from Rhodesia and Malawi but two small workers are present in the MCZ, Cambridge collection, from the Ivory Coast savannah. One of them (a teneral) approaches the lower end of the size range quoted above but the other is very small.

The dimensions of the two are TL 5·6, 6·7, HL 1·26, 1·40, HW 1·10, 1·22, CI 87, 87, ML 0·92, 0·98, MI 73, 70, SL 0·72, 0·80, PH 0·68, 0·72, PL 0·60, 0·64, LPI 113, 113, DPW 0·52, 0·56, DPI 76, 87. Ocular diameter 0·07, 0·08.

The sculpture is somewhat more coarse than in Rhodesian specimens, with the punctures larger and more distinctive, especially on the head and dorsal alitrunk. There is a possibility that these two specimens are in fact referable to a different species, very closely related to *subterranea*, but our present knowledge of the genus does not permit me to separate them.

Santschi's *punctatus*, based upon a single male, appears to be the male of *subterranea* as the holotype compares well with a damaged male of *subterranea* in the BMNH collection.

MATERIAL EXAMINED.

IVORY COAST: Lamto, Toumodi (*J. Lévieux*). MALAWI: Mlanje (*S. A. Neave*); Chiroma Ruo (*R. C. Wood*). RHODESIA: Bulawayo (*G. Arnold*).

Plectroctena ugandensis Menozzi

Plectroctena ugandensis Menozzi, 1932 : 99, fig. 2. Holotype female, UGANDA: Bussu (*E. Bayon*) (location of type not known).

Note: Professore E. Mellini (IE, Bologna) informs me that the holotype of this species cannot be found in the Menozzi collection.

I have not been able to locate the type of this species but judging from the original description I refer two specimens from MCZ, Cambridge to *ugandensis*. Both are alate females and as Menozzi points out, *ugandensis* is very closely related to *subterranea*. When the females of both these species are better known the two may prove to be inseparable.

Characters useful in separating the species include size (*ugandensis* is notably smaller) and the fact that in *ugandensis* the antennal scapes do not reach back to the level of the lateral ocelli, whereas in *subterranea* the scapes easily surpass them.

Dimensions of the two females referred to this species are: TL 9·4–9·8, HL 1·86–1·88, HW 1·64, CI 87–88, ML 1·42–1·44, MI 76–77, SL 1·04–1·08, PH 0·86, PL 0·86–0·88, LPI 98–100, DPW 0·76, DPI 88. Ocular diameter 0·30.

Note particularly the relatively low petiole (LPI in *subterranea* female is 123).

MATERIAL EXAMINED.

ZAIRE: Coquilhatville (?).

A SPECIES PROPERLY EXCLUDED FROM *PLECTROCTENA*

Psalidomyrmex mabirensis (Arnold) **comb. et stat. n.**

Plectroctena mandibularis subsp. *mabirensis* Arnold, 1954 : 293, figs 3, 3a. Syntype workers, UGANDA: Mabira Forest (*G. Arnold*) (probably in Bulawayo Museum, Rhodesia).

I have not examined the types of this species but from Arnold's description and figures it is apparent that the species belongs to the genus *Psalidomyrmex*, and is related to *foveolatus* André. The description of the sculpturation does not accurately fit any of the commoner species of *Psalidomyrmex* and for this reason, and also to remove any connection with *mandibularis*, *mabirensis* is granted new status as a good species.

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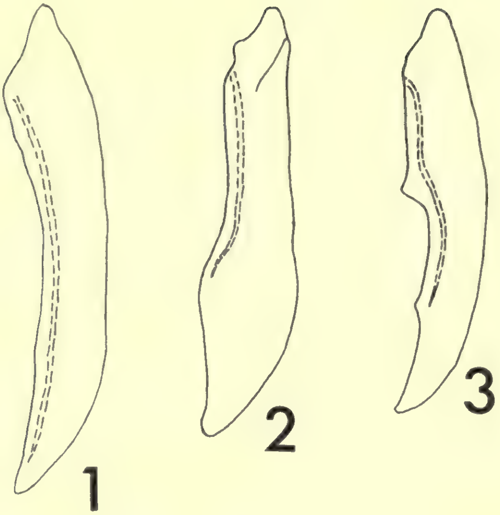

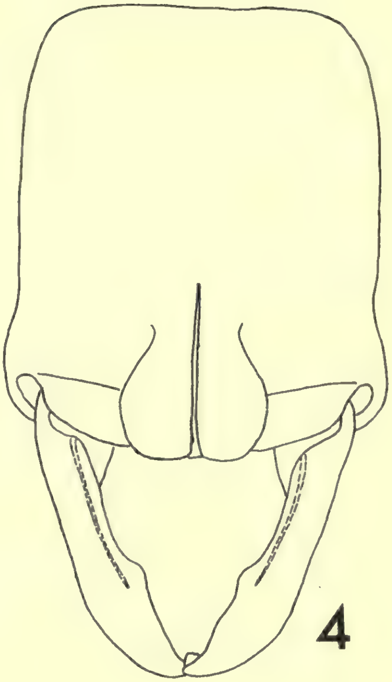

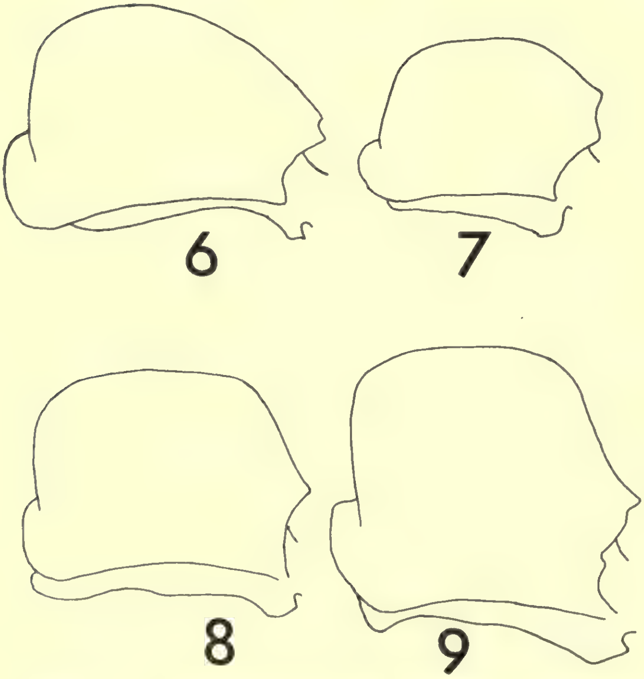

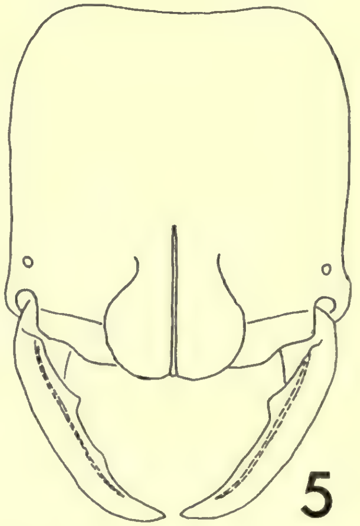

FIGS 1–3. Dorsal view of left mandibular blade in workers, hairs omitted. 1. *macgeei*, 2. *hastifer*, 3. *minor*, showing characteristic shape of mandible in the genus.

FIG. 4. Dorsal view of head of *anops*, pubescence and antennae omitted.

FIG. 5. Dorsal view of head of *cryptica*, pubescence and antennae omitted.

FIGS 6–9. Lateral view of petiole in workers. Anterior face to the right; pilosity omitted. 6. *hastifer*, 7. *anops*, 8. *macgeei*, 9. *minor*.

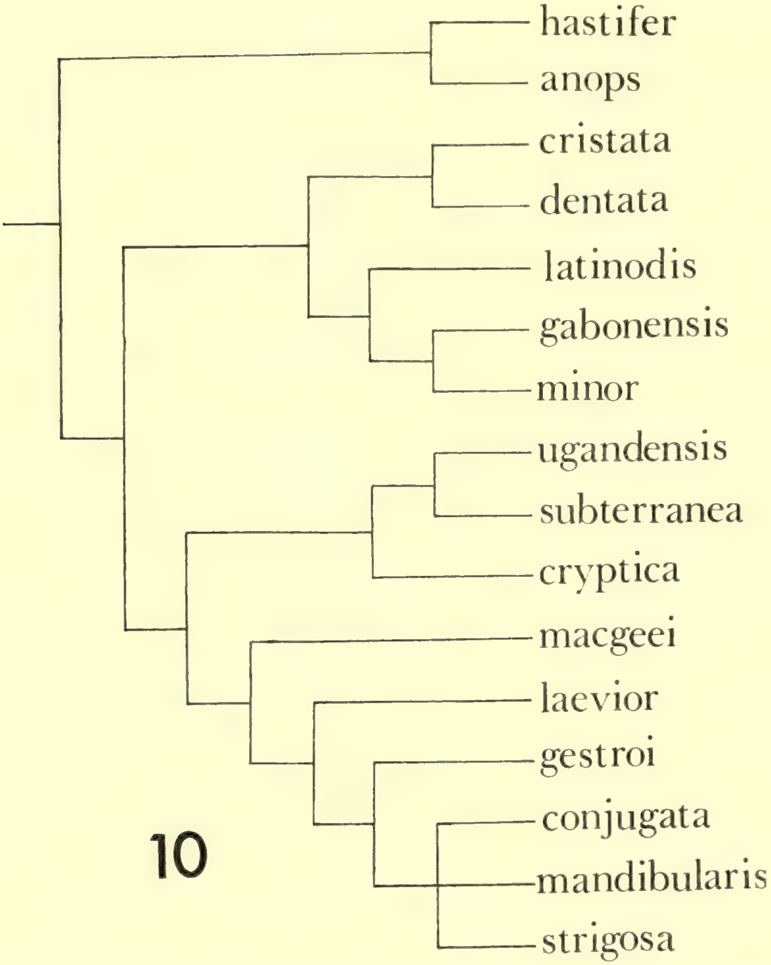
hastifer
anops
cristata
dentata
latinodis
gabonensis
minor
ugandensis
subterranea
cryptica
macgeei
laevior
gestroi
conjugata
mandibularis
strigosa
10

FIG. 10. Dendrogram to show affinities of species in genus *Plectroctena*. Lines do not imply phylogeny.

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17 JUL 1974
NATURAL HISTORY

A REVISION OF THE GENUS *PASSEROMYIA* RODHAIN & VILLENEUVE (DIPTERA : MUSCIDAE)

A. C. PONT

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 30 No. 7
LONDON : 1974

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BY

ADRIAN CHARLES PONT

Pp. 339–372; 9 *Text-figures*

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THE BRITISH MUSEUM (NATURAL HISTORY)

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A REVISION OF THE GENUS *PASSEROMYIA* RODHAIN & VILLENEUVE (DIPTERA: MUSCIDAE)

By A. C. PONT

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SYNOPSIS

The tropical Old World genus *Passeromyia* is revised, and the five species are keyed and described. Knowledge of the larvae and their avian hosts is summarised.

INTRODUCTION

THE genus *Passeromyia* Rodhain & Villeneuve is a small genus of Muscid flies distributed throughout the Ethiopian and Indo-Australasian regions. Adults are moderately large and robust, measuring up to 9 mm in body-length, and have a very characteristic appearance on account of their densely pruinose bodies and hyaline wings. In the larval stage, the species are associated with birds, either as scavengers in the nests or as parasites of the nestlings.

Despite the fact that there are only five species in the genus, the adult taxonomy and synonymy has been the subject of much confusion, but the study of a large amount of material, including many reared series, combined with study of the available types, has clarified this situation. It was subsequently found that striking differences in the larval feeding habits of the three most widespread species confirmed the species-concepts reached on the basis of the adult taxonomy.

LOCATION OF MATERIAL STUDIED

The material studied is located in the following museums and institutions (abbreviations given are those used in the text in the lists of material examined).

AM	The Australian Museum, Sydney
ANIC	The Australian National Insect Collection, CSIRO, Canberra
BMNH	British Museum (Natural History), London

BPBM	Bernice P. Bishop Museum, Honolulu
CNC	The Canadian National Collection, Ottawa
HEP	Dr H. E. Paterson's private collection, Nedlands, Western Australia
IAR	Institute of Agricultural Research, Samaru, Nigeria
MCSN	Museo Civico di Storia Naturale, Milan
MNHN	Muséum National d'Histoire Naturelle, Paris
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin
MRAC	Musée Royal de l'Afrique Centrale, Tervuren
SPHTM	School of Public Health and Tropical Medicine, Sydney
WAM	The Western Australian Museum, Perth
ZM	Zoölogisch Museum der Universiteit, Amsterdam

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Genus ***PASSEROMYIA*** Rodhain & Villeneuve

Passeromyia Rodhain & Villeneuve, 1915 : 592. Type-species: *Muscina heterochaeta* Villeneuve, 1915, by monotypy.
Ornithomusca Townsend, 1916 : 45. Type-species: *Ornithomusca victoria* Townsend, 1916 [= *Morellia indecora* Walker, 1858], by original designation. [Synonymy by Bezzi, 1922 : 31.]
Passeromyia Rodhain & Villeneuve; Rodhain & Bequaert, 1916 : 249.
Passeromyia Rodhain & Villeneuve; Stein, 1919 : 86–87.
Passeromyia Rodhain & Villeneuve; Bezzi, 1922 : 31.
Passeromyia Rodhain & Villeneuve; Malloch, 1925 : 46.
Passeromyia Rodhain & Villeneuve; Malloch, 1928 : 328.
Passeromyia Rodhain & Villeneuve; Townsend, 1935 : 143.
Ornithomusca Townsend; Townsend, 1935 : 143.
Passeromyia Rodhain & Villeneuve; Townsend, 1937 : 63.
Ornithomusca Townsend; Townsend, 1937 : 62.
Passeromyia Rodhain & Villeneuve; Séguy, 1937 : 382.
Passeromyia Rodhain & Villeneuve; Hardy, 1937 : 28.
Orthomusca Townsend; Hardy, 1937 : 28. [Error for *Ornithomusca* Townsend.]
Passeromyia Rodhain & Villeneuve; Emden, 1939 : 52.
Passeromyia Rodhain & Villeneuve; Zumpt, 1965 : 39.
Passeromyia Rodhain & Villeneuve; Hennig, 1965 : 31.
Passeromyia Rodhain & Villeneuve; Emden, 1965 : 194.
Passeromyia Rodhain & Villeneuve; Vockeroth, 1972 : 4.

DIAGNOSIS. *Passeromyia* can be recognized by the large truncated lower squama, bare pteropleuron and prosternum, plumose arista, haired hypopleuron below spiracle (except *veitchi*), upcurved vein 4 (Text-fig. 2), and partially bare wing-membrane (except *veitchi*). The head-shape (Text-fig. 1) is very characteristic, especially the long antennae and broad male frons.

Most specimens can be identified as *Passeromyia* using the African and Oriental keys of Emden (1939; 1965).

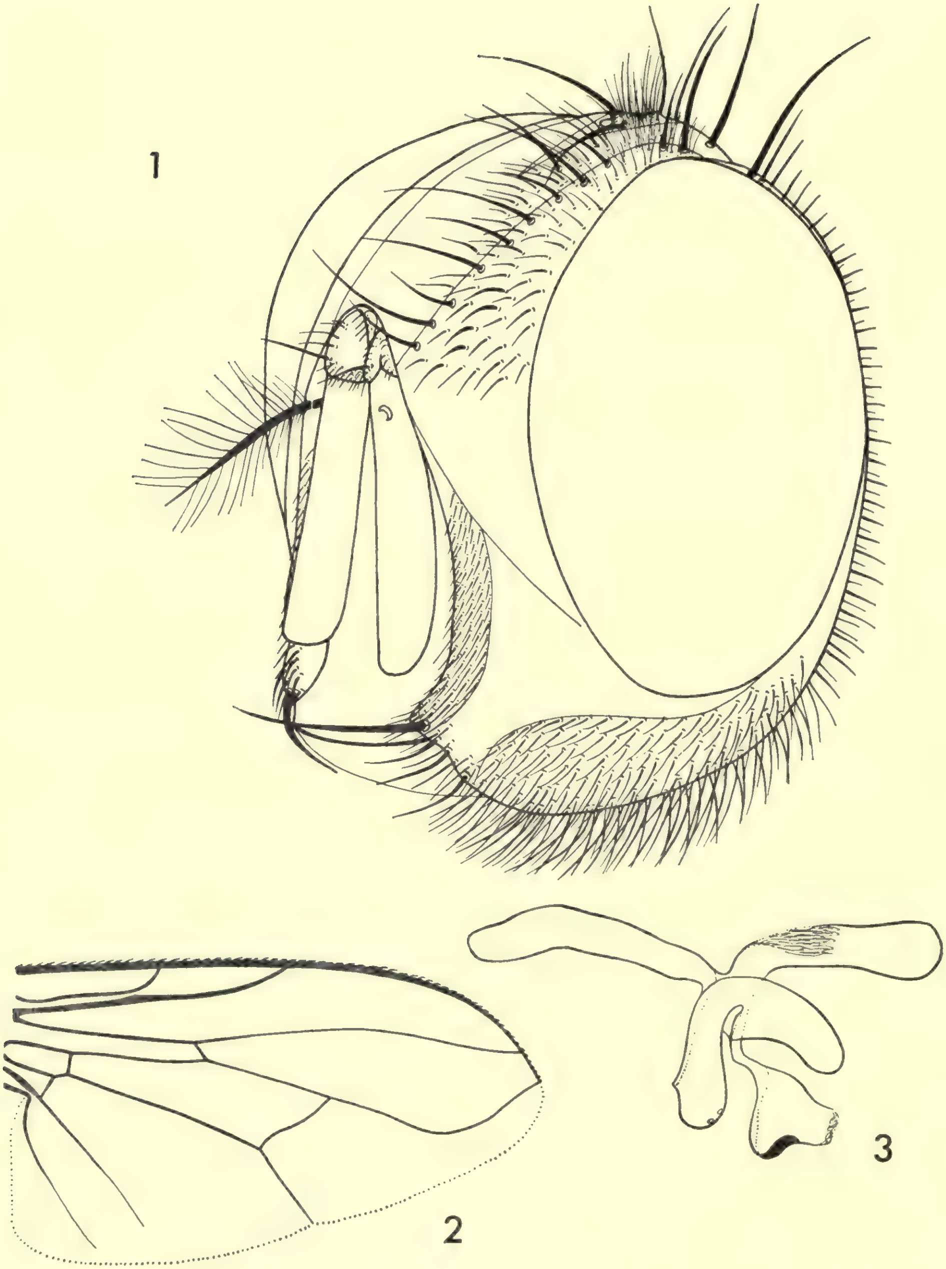
DESCRIPTION. Frons dichoptic in both sexes (Text-fig. 1), at middle almost (♂) to quite (♀) as broad as the width of an eye at this point. Interfrontal setae present, proclinate *ors* absent. Arista short, shorter than length of 3rd antennal segment; long-plumose, the dorsal plumes longer and sparser than the ventral plumes, and the longest equal to width of 3rd antennal segment. Face and antennae long, face bare. Palpi and proboscis of normal structure, mentum of proboscis shining. *Acr* 2–3 + 2–5 (usually 3–4 *post* pairs). *Dc* 2 + 4. 1–4 *ia* setae. *Pra* present. 3 strong *pa* setae. Post-alar declivity setulose or bare. Supra-squamal ridge, prosternum and propleural depression bare. Prostigmatal seta present. Infra-alar bulla and vallar ridge pilose, pteropleuron bare. *Stpl* 1 + 2. Hypopleuron bare on beret, rarely with a few hairs; bare or setulose below spiracle and on metepisternum. Metathoracic spiracle large, egg-shaped, without setae on margins. Supraspiracular convexity long-pilose. Squamopleuron bare. Scutellar setulae descending on to lateral margins and ventral angle except between the apical setae. Mid femur with 0 *a* and 2–3 *d–p* preapical setae. Mid tibia without *ad* or ventral setae. Hind tibia with a short calcar, not or hardly exceeding tibial depth; *d* and *ad* apical setae moderate; *pv* apical absent. Subcostal sclerite bare. Stem-vein bare. Vein 1 bare. Vein 3 with several setulae in basal part, these sometimes absent on upper wing-surface. Vein 4 conspicuously curved forward towards vein 3 in apical part (Text-fig. 2); cell R5 ending before wing-tip and at apex slightly broader than length of small cross-vein. Lower squama of the *Musca*-type, bare. Sternite 1 setulose. Male aedeagus (Text-fig. 3) with praegonite and postgonite well-developed; epiphallus strong; juxta simple, membraneous. Female ovipositor (Text-figs 8–9) long, 4·0–4·5 times length of tergite 5, with the tips of the cerci free-lying; tergite 8 and sternite 8 divided longitudinally, the anterior and posterior halves fused; post-genital plate deeply incised; spiracles absent; 3 spermathecae, spherical, oval or sausage-shaped.

The male genitalia within the genus are very uniform in structure. The only variation is in the male 5th sternite of *heterochaeta* (Text-fig. 4): in this species the lobes are rather broader and the sternite bears longer and denser setulae than in any of the other species (Text-fig. 5).

The female ovipositors within the genus are also very uniform in structure. The cerci point to relationship with the Muscinae + Phaoniinae, although rather reminiscent of the Mydaeinae in that their inner surfaces are for most of their length hollowed out and adpressed to the connective membrane, but their tips project slightly beyond the membrane (Text-figs 8 + 9). Sternite 8 is usually weakly sclerotized, and is frequently difficult to study due to the immaturity of many of the specimens available for study: it is not always clear whether the anterior and posterior halves are fused or not; if not fused then they are closely approximated with only a transverse seam indicating the division. The important point is, however, that the two halves are fully developed and that the sternite is not reduced to a pair of hind-marginal plates. Similarly, tergite 8 has the anterior and posterior halves fused, though sometimes weakly so, and their inner apical edges are sometimes weakly sclerotized; there is never any transverse fusion at this point although the precise limits of the tergite may be difficult to discern.

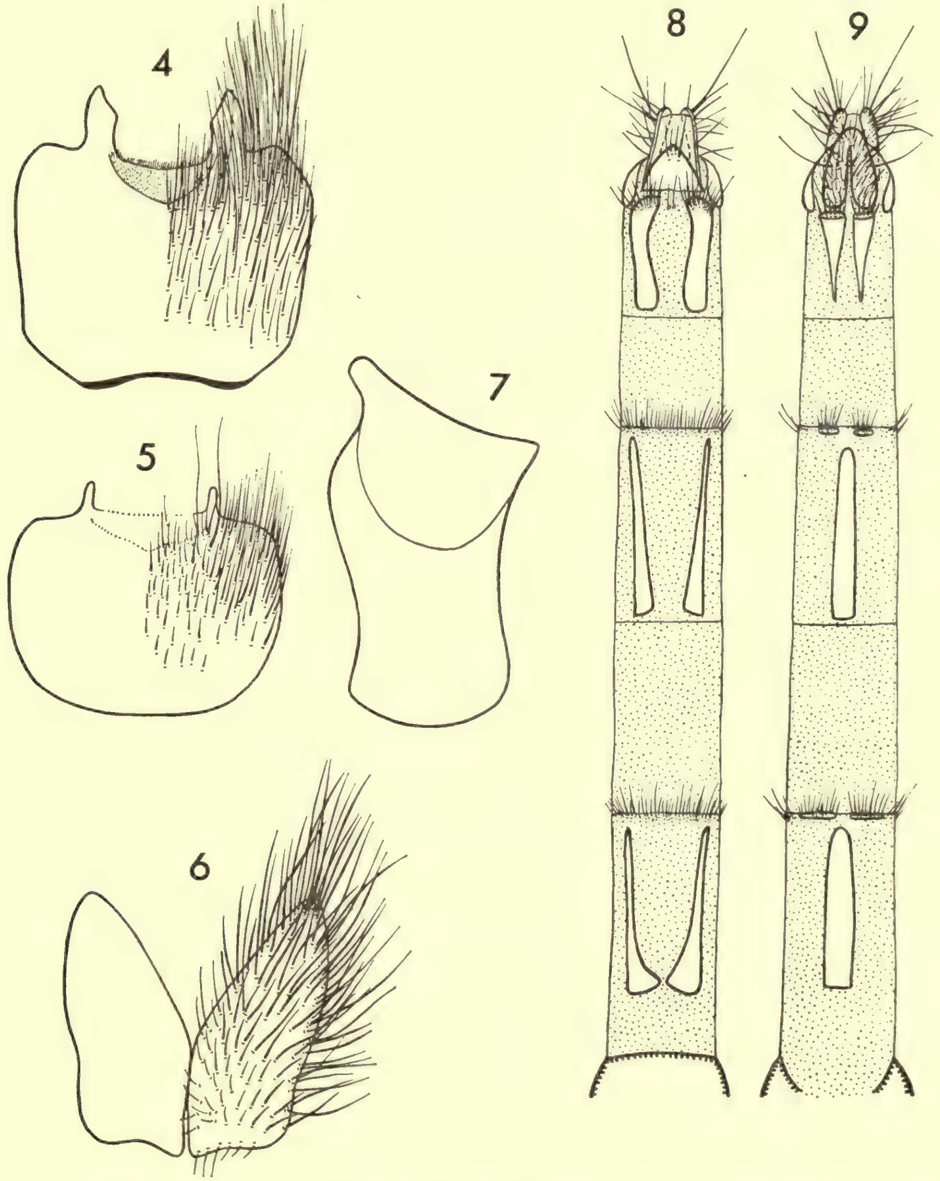
DISTRIBUTION. Throughout the Ethiopian and Oriental regions; Australasia and the Western Pacific. Absent from the Malagasy and New Zealand subregions.

DISCUSSION. *Passeromyia* and *Ornithomusca* were described at almost the same time from adults reared from larvae infesting nestling birds, *Passeromyia* from Africa and *Ornithomusca* from Australia. In spite of the detailed descriptions given later by Rodhain & Bequaert (1916), Stein (1919) was unable to recognise *Passerom-*



Figs 1–3. 1, *Passeromyia steini* Pont, male head in fronto-lateral view, frontal setae and arista shown on one side only. 2, *P. heterochaeta* (Villeneuve), wing. 3, *P. heterochaeta*, male aedeagus in lateral view (S. Africa).

yia heterochaeta Villeneuve and did not include it in his key to genera or in his catalogue of world species. So far as the other species in the genus are concerned, Stein (1919) placed *longicornis* Stein in *Muscina* Robineau-Desvoidy, *longicornis*



FIGS 4–9. Genitalia of *Passeromyia*. 4, *heterochaeta* (Villeneuve), male 5th sternite (S. Africa). 5, *indecora* (Walker), male 5th sternite (Australia). 6, *indecora*, male cercal plate (Australia). 7, *heterochaeta*, male surstylus (S. Africa). 8, 9, *heterochaeta*, female ovipositor (India): 8, dorsal view; 9, ventral view.

Macquart remained unplaced, *indecora* Walker was placed in *Morellia* Robineau-Desvoidy, and *victoria* Townsend was omitted altogether.

Bezzi (1922) was the first to recognize the kinship of these taxa. He synonymised *Ornithomusca* with *Passeromyia*, gave a key to the two species he recognized, *longicornis* Macquart (= *victoria* Townsend) and *heterochaeta* Villeneuve (= *longicornis* Stein), and gave notes on the distribution and hosts. Since that time, one new species from Fiji has been described into the genus (Bezzi, 1928) and the Australian *indecora* has been transferred to *Passeromyia* from *Morellia* (Emden, 1965), and most authors have followed Bezzi's arrangement (Séguy, 1937; Zumpt, 1965).

There has been considerable confusion over the specific synonymies in this genus, which has been aggravated by the homonymy of *longicornis* Stein with *longicornis* Macquart together with doubts as to whether they were in fact congeneric. The taxonomy of the Australian species has never been worked out, although it has been recognized that several species might occur there.

Cyrtonevra analis Macquart, 1851, has sometimes been associated with Australian species of *Passeromyia*, but I have previously shown that this is a Neotropical species of *Graphomya* Robineau-Desvoidy (Pont, 1967 : 182).

Cyrtoneura pruinosa Wulp, 1880, almost certainly belongs to *Passeromyia*, but the types are lost (Pont, 1970*a* : 100) and I cannot identify it with any of the described species.

SYSTEMATIC POSITION. Opinions on the systematic position have varied. The genus has usually been placed in the Muscinae (Malloch, 1925; 1928; Séguy, 1937; Hardy, 1937; Emden, 1939), because of the forward curvature of vein 4 and the truncated lower squama. Townsend (1935; 1937), with characteristic vigour, defended the view that *Passeromyia* and *Ornithomusca* were distinct genera, and placed them in a tribe Hemichlorini in which were also included *Hemichlora* Wulp, *Ochromusca* Malloch and *Synthesiomyia* Brauer & Bergenstamm. Recent work (Emden, 1965; Hennig, 1965) has placed *Passeromyia* close to Old World genera such as *Muscina* Robineau-Desvoidy, *Synthesiomyia* Brauer & Bergenstamm, *Calliphoroides* Malloch, *Fraserella* Steyskal, *Phaonina* Emden and *Phaonidia* Emden. In Emden's system, this unit is included in the tribe Phaoniini of the subfamily Phaoniinae. In Hennig's system, this unit is provisionally included in the tribe Hydrotaeini of the subfamily Muscinae, though Hennig stresses that his Hydrotaeini is paraphyletic. It is still not certain where this group of genera should be placed, and I deliberately excluded them from my recent revision of Australian Muscinae (Pont, 1973). Whilst the male aedeagus places the genus in Hennig's group Muscinae + Phaoniinae, the female ovipositor supports assignment in the Muscinae whilst the absence of proclinate *ors* on the female frons indicates the Phaoniinae. Vockeroth (1972) has included the genus in the Muscinae.

In some respects *Passeromyia* resembles the tropical American genus *Neomusca* Malloch: larvae of both genera parasitize nestling birds and form cocoons, and the adults have a certain similarity in general appearance. The ovipositors also show a close similarity (compare Text-figs 8, 9 with Hennig, 1965: figs 48, 49), especially in the structure of the cerci and sternite 8. *Neomusca*, however, has a setulose pteropleuron and is placed in the subfamily Cyrtoneurininae (Pont, 1972), but this is another obviously paraphyletic group and Hennig (1965) considered that *Neomusca* might be related to the Hydrotaeini despite the setulose pteropleuron.

BIOLOGY AND REVIEW OF THE LITERATURE. So far as is known, the larvae live in birds' nests where they develop as scavengers or as obligatory parasites of the nestlings: the biology of three species, *heterochaeta*, *indecora* and *steini*, is known; one host is known for *longicornis*, which may have the same larval habits as *indecora* since it is taxonomically so close; *veitchi* is unknown. Ledger (1969), writing of the African species *heterochaeta* which is an ectoparasitic blood-sucker on nestlings, thought that the ancestral larvae lived as scavengers in the nest débris and later became facultative parasites of the nestlings and eventually obligatory parasites. The saprophagous origin in *heterochaeta* is shown by the fact that if a bird dies the larvae may continue feeding on the carcase or may penetrate into the abdomen (Patton, 1920). Further confirmation was given by Hindwood (1947), who was able to distinguish two different species in Australia: one species (*steini*) is a free-living scavenger in the nest, feeding solely on excreta, food remnants and dead nestlings but never attacking living birds; the second species (*indecora*) is an obligatory subcutaneous parasite of living nestlings, feeding on blood, though if the host dies it will continue to feed in the carcase until ready to pupate. All three stages in the development of this feeding-habit are represented in the genus, and it is interesting that the endemic Australian species *indecora* has the most specialized habit (endoparasitism), whilst the widespread Indo-Australasian *steini* has the most primitive habit (as a scavenger).

Hosts tend to be birds forming compact and well-lined nests, and pupation takes place in the nest-lining, in the feather-lining or beneath it in the grass-lining. With loose nests, larvae pupate beneath them or in the ground. The larva forms a cocoon prior to pupation. Adults feed on rotting fruit, sap and resin, coccid exudate, and excrements, and are frequently found indoors.

A considerable amount of work has been done on the biology and host-range of *heterochaeta* in Africa, and since it is the only African representative of the genus this work can be accepted without further discussion and it is noted in the text below under *heterochaeta* (p. 354). In Australia, however, there are three species that have only been partially and rarely separated in the past, *longicornis*, *indecora* and *steini*, and consequently much of the literature which refers to *longicornis* (Macquart), as the oldest name in the genus, frequently covers mixed series. *P. longicornis* is in fact confined to Tasmania: the records of this species refer to *indecora* or *steini*, and it is thus necessary to review the Australian literature critically in the light of present taxonomic knowledge. The literature was partially and uncritically reviewed by Chisholm (1952) and Owen (1954). Hicks (1959; 1962) has given a bibliography, but this is not complete.

The first Australian host-record is that of Townsend (1916), who described his *Ornithomusca victoria* from *Pardalotus* sp. Shortly after this, Gilbert (1919) recorded a species as a subcutaneous parasite of birds, without naming it, giving an account of the life-history and listing as hosts *Menura superba*, *Meliornis sericea* [= *Phyli-*

donyris niger], *M. novaehollandiae* and *Gliciphila fulvifrons* [= *melanops*]. In a later paper Gilbert (1923) named the parasite as *longicornis* Macquart. I have not been able to trace Gilbert's material, but an undated specimen from a nestling of *Gliciphila melanops* is *indecora* Walker and the endoparasitic habit described by Gilbert indicates this species. In the same year as Gilbert, Harvey & Harvey (1919) reported finding parasitic larvae resembling blowflies in nestlings of *Anthus australis* [= *novaeseelandiae*] but none of this material has been traced. Again, it seems probable that *indecora* is the species in question. Cleland (1922), in an account of Australian bird parasites, quotes these larval infestations recorded by Gilbert and the Harveys. Bezzi (1922) recorded a specimen of *longicornis* Macquart reared from *Meliornis* [= *Phylidonyris*] *novaehollandiae*, but this specimen is not now in his collection and the record cannot be checked.

The most extensive account is by Hindwood (1930), whose material was identified as *longicornis* Macquart by Séguy. He described various cases of the infestation of nestlings, all in the Sydney area of New South Wales (Doonside, Middle Harbour, Greenwich and Marley National Park), and gave an account of the life-history together with some figures of infestations in nestlings and of the immature stages. In addition to the four birds in Gilbert's (1919) list, Hindwood recorded as hosts *Carduelis carduelis*, *Anthochaera chrysoptera*, *Pachycephala rufiventris* and *Rhipidura leucophrys*. I have not been able to trace any of this material, but material reared by Hindwood from several species of bird in New South Wales between 1931 and 1950 belongs to *indecora*, except for one series from *Dacelo gigas* which is *steini* (see below).

Hardy (1937) reared a species from nests of *Myzantha garrula* [= *Manorina melanocephala*], which he identified as *longicornis* Macquart, and he recorded the species from Queensland to Victoria and also recorded from its pupae Hymenopterous parasites of the genera *Mormoniella* Ashmead (Pteromalidae), *Paraspilomicrus* Johnston & Tiegs (Diapriidae) and *Tachinaephagus* Ashmead (Encyrtidae), all of which are normally blowfly parasites. I have not located any of Hardy's material, and it is not clear which species he had before him.

Elliot (1938) recorded *longicornis* from a nest of *Acanthiza uropygialis* in the Moonie River district, where larvae were found in the lining alongside a dead nestling, and Gilbert (1939) recorded the same species from larvae infesting a nestling of *Hylacola pyrrhopygia* in New South Wales. I have seen both sets of material, and all the specimens are *indecora* Walker.

The first account of larvae of what was almost certainly *Passeromyia* living as scavengers is given by Ward (1938), who published a curious report of the feeding-cycle of nestlings of the Bee-Eater [*Merops ornatus*]: he stated that the adults and nestlings defaecate in the nest which is thus able to support an enormous number of scavenging maggots which in their turn generate enough heat to warm the nestlings and, on emerging as adult flies, provide food for the nestlings. This idea was refuted by C. E. B. [ryant] (1939), but it seems probable that the scavenger larvae observed by Ward were in fact *steini*. Roberts (1940) published a detailed account of unnamed Muscid larvae that he observed at Cranbourne, Victoria, in the nest of an Eastern Rosella (*Platycercus eximius*). These larvae were free-living and fed voraciously on excrement and dead nestlings, but did not attack the living birds. Roberts wrote that he hoped to rear the species to establish its identity, and I have seen this reared material which proves to be *steini*.

Hindwood (1947), in a very interesting account, described the habits of larvae that he found living as scavengers in the nest of a Laughing Jackass (*Dacelo gigas*) at Lane Cove, New South Wales. He found that the larvae fed only on food remains and excreta in the nest, though they also fed on raw meat in the laboratory, and he recorded details of the life-history, adult habits, and parasites. His material was studied by K. C. McKeown of the Australian Museum, who found that it could not be *longicornis* Macquart, a species with densely haired eyes. Hindwood therefore distinguished two Australian nest species: '*longicornis*' with hairy eyes (in fact *indecora*), larvae true subcutaneous parasites in living birds though continuing to feed until pupation if the host dies; and 'new species' with bare eyes (in fact *steini*), larvae free-living scavengers. This distinction appears to hold good for larvae and adults, and I have seen some of Hindwood's material from *Dacelo gigas* and can confirm that it is *steini*.

Hindwood (op. cit.) also recorded the species with hairy eyes from the Leaden Flycatcher (*Myiagra rubecula*), the nestling having been killed by the larvae, and I have seen this material which is *indecora*. He recorded the species with bare eyes from *Gymnorhina tibicen*, reared by Elliot, which material I have not seen but which must be *steini*, and also stated that Roberts' material from *Platycercus eximius* had bare eyes.

In two later papers, Hindwood recorded *longicornis* from the nest of the Kookaburra (1951*a*), as host of a Clerid beetle parasite, and from the nest of the Eastern Rosella (1951*b*). Since he had previously (Hindwood, 1947) recorded this beetle from his 'bare-eyed' *Passeromyia* in the Kookaburra's nest, this record must refer to *steini* and not to *indecora* (= *longicornis* Macquart sensu Hindwood, 1947). The same is probably the case with the flies from the Eastern Rosella nest, which I have not seen.

More recently, Bourke (1957) has recorded an unnamed species of *Passeromyia* from nests of *Hylochelidon* [= *Petrochelidon*] *ariel* near Gilgandra in New South Wales. I have seen his material which consists mainly of *indecora*, with some *steini*. Further Bourke material, reared from nests of *Merops ornatus*, belongs to *steini*.

Zumpt (1965) has summarized some of these records under the name of *longicornis* Macquart, giving notes on the morphology of the adult, mature larva and pupa, and accounts of the biology, hosts and pathogenesis.

A full check-list of the known hosts of *Passeromyia* is given at the end of this paper.

KEY TO THE SPECIES OF *PASSEROMYIA*

1 Post-alar declivity bare. Eyes bare or sparsely haired. Abdomen without any trace of a shifting tessellated pattern. 1–2 *ia* setae. Fore tibia without *p* setae (unknown for *veitchi*) 2

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– Post-alar declivity with a tuft of setulae. Eyes densely haired. Abdomen with at least weak indications of a tessellated pattern. 2–3 *ia* setae. Fore tibia with 1 or more *p* setae.

Hypopleuron always haired below spiracle; ♂: sternite 2 with normal comparatively strong setae 3

2 2 *ia* setae. Wing-membrane quite extensively devoid of microtrichia on basal part, for example the discal cell bare in basal half or less. Hypopleuron haired below spiracle and bare on metepisternum. Abdomen with dense blue dust. Mesonotum with ash-grey to bluish dust and with very weak vittae. Halteres brown to dark brown, knob black. Palpi yellow or black. ♂: sternite 2 covered entirely with short fine dense setae . . . . **steini** (p. 354)

– 1 *ia* seta. Wing-membrane entirely covered with microtrichia, without any bare patches. Hypopleuron bare below spiracle and haired on metepisternum. Abdomen with very thin blue dust. Mesonotum with brownish grey to golden grey dust and with conspicuous vittae. Halteres yellow, the knob orange. Palpi black. ♂: unknown. . . . . **veitchi** (p. 365)

3 Epaulet dark brown. Squamae dark, at least margins of upper and lower ones dark brown. Parafrontalia and parafacialia dark brown pruinose. Scutellum entirely dark

Palpi black. 2 *ia* setae . . . . **longicornis** (p. 363)

– Epaulet orange. Squamae pale, at most margin of upper one partly brown. Parafrontalia and parafacialia lighter pruinose, varying from brown through golden to silvery white. Scutellum yellow at tip 4

4 Abdomen grey dusted, with a conspicuous shifting tessellated pattern. Mesonotum with grey to yellowish grey dust and with conspicuous vittae. 3rd antennal segment shorter, 4 times length of 2nd segment . . . **heterochaeta** (p. 350)

Abdomen densely blue dusted, with at most weak indications of a tessellated pattern. Mesonotum with dense ash-grey or blue-grey dust and very weak vittae. 3rd antennal segment longer, 5 times length of 2nd segment . . **indecora** (p. 358)

Passeromyia heterochaeta (Villeneuve)

(Text-figs 2–4, 7–9)

Muscinae sp. Rodhain, 1914 : 213.
Muscinae sp. Roubaud, 1915 : 96.
Muscina heterochaeta Villeneuve, 1915 : 225. Lectotype ♀, ZAMBIA (BMNH), designated by Emden (1965 : 196) [examined].
Passeromyia heterochaeta (Villeneuve); Rodhain & Villeneuve, 1915 : 592.
Passeromyia heterochaeta (Villeneuve); Rodhain & Bequaert, 1916 : 248–260, figs 1–6.
Passeromyia heterochaeta (Villeneuve); Roubaud & Saceghem, 1916 : 765.
Passeromyia heterochaeta (Villeneuve); Roubaud, 1917 : 423.
Passeromyia heterochaeta (Villeneuve); Keilin, 1917 : 438.
Passeromyia heterochaeta (Villeneuve); Rodhain, 1919 : 499–510, figs 1, 2.
Passeromyia heterochaeta (Villeneuve); Stein, 1919 : 86–87.
Passeromyia heterochaeta (Villeneuve); Patton, 1920 : 30–31, pl. 5.
Passeromyia heterochaeta (Villeneuve); Patel *in* Fletcher, 1920 : 101.
Passeromyia heterochaeta (Villeneuve); Bezzi, 1922 : 31.
Passeromyia heterochaeta (Villeneuve); Malloch, 1928 : 328.
[*Passeromyia longicornis* (Stein); Malloch, 1928 : 328, in part. Misidentification.]
Passeromyia heterochaeta (Villeneuve); Senior-White, 1930 : 67.
Passeromyia heterochaeta (Villeneuve); Cuthbertson, 1932 : 3.
Passeromyia heterochaeta (Villeneuve); Cuthbertson, 1935 : 16, pl. 1, fig. 4, pl. 4, fig. 14.

Passeromyia heterochaeta (Villeneuve); Townsend, 1935 : 143.
Passeromyia heterochaeta (Villeneuve); Townsend, 1937 : 63.
Passeromyia heterochaeta (Villeneuve); Séguy, 1937 : 383.
Passeromyia heterochaeta (Villeneuve); Cuthbertson, 1939 : 142, pl. 1, figs 5–7, pl. 2, figs 22, 23.
Passeromyia heterochaeta (Villeneuve); Hennig, 1941 : 215–216.
Passeromyia heterochaeta (Villeneuve); Séguy, 1946 : 125–126.
Passeromyia heterochaeta (Villeneuve); Taylor, 1949 : 171.
Passeromyia heterochaeta (Villeneuve); Séguy, 1950 : 349, 351.
Passeromyia heterochaeta (Villeneuve); Séguy, 1955 : 133, 136.
Passeromyia heterochaeta (Villeneuve); Hicks, 1959 : 218.
Passeromyia heterochaeta (Villeneuve); Hicks, 1962 : 256.
Passeromyia heterochaeta (Villeneuve); Zumpt, 1965 : 39–40, figs 41–44.
Passeromyia heterochaeta (Villeneuve); Emden, 1965 : 195, figs 8j, 8k, 10f, 11l, 53.
Passeromyia heterochaeta (Villeneuve); Hennig, 1965 : fig. 11.
Passeromyia heterochaeta (Villeneuve); Haeselbarth, Segermann & Zumpt, 1966 : 38, fig. 28.
Passeromyia heterochaeta (Villeneuve); Ledger, 1969 : 28–30, figs 1–3.

NOTE ON TYPE-MATERIAL. Villeneuve described this species from 4 ♀, and Emden (1965) designated the syntype in BMNH as lectotype. I have seen, and have labelled as paralectotypes, the syntype from Kam-si in MNHN and the syntype from Elisabethville in MRAC. The syntype from Mombasa Island has not been traced, in BMNH, MNHN, MRAC, Villeneuve's collection (Brussels) or Mesnil's collection (CNC).

NOTES ON SYNONYMY. *P. heterochaeta* was synonymized with *longicornis* (Macquart) by Malloch (1925), followed by Hardy (1937), but was reinstated as a valid species with *longicornis* (Stein) as a synonym by Malloch himself (1928), followed by Séguy (1937).

DIAGNOSIS. *P. heterochaeta* can be distinguished from the other species of the genus by the conspicuous shifting pruinose pattern on the abdomen. It has a well-marked pattern of vittae on the mesonotum, and both abdomen and mesonotum are strikingly ash-grey dusted.

The male 5th sternite (Text-fig. 4) differs from that of the other species (e.g. *indecora*, Text-fig. 5) by the rather thicker apical lobes and the much longer setae.

This is the only African species of the genus, and does not occur in Australia.

DESCRIPTION. *Head.* Eyes with moderately long dense hairs which are equal to only one-third width of 3rd antennal segment in male, shorter and sparser in female; eye-facets of uniform width. Ocellar setae moderate. *Vte* strong, slightly weaker than *vti* and twice as long as the adjacent post-ocular setulae. Parafrontalia, parafacialia, face, genae and most of occipital dilation yellowish grey pruinose; occiput with a light grey pruinose band along posterior eye-margin from vertex down on to occipital dilation. Interfrontalia reddish orange in ground-colour. Parafrontalia quite broad, at middle of frons a parafrontale slightly less than (♂) or equal to (♀) width of 3rd antennal segment and one-quarter to one-third width of interfrontalia at this point. *Ori* strong and inclinate, 6–8 pairs with a few fine interstitials, on lower three-quarters of frons, the upper ones rather more proclinate; parafrontalia otherwise with numerous dense fine hairs and setulae from vertex to lunula. Interfrontalia on upper half with 1–2 pairs of inclinate setae, and many setulae and hairs covering much of interfrontal surface here. First and 2nd antennal segments reddish, rather infuscate on disc; 3rd segment reddish at base, otherwise dark brown. Third antennal segment long, in frontal view 4 times as long as 2nd segment and almost reaching to epistoma; rather more slender in male than in female. Parafacialia broad, at lunula, twice as broad as width of 3rd antennal segment and broader than this segment throughout. Parafacialia and genae bare. Genae broad; the depth below lowest eye-margin equal to twice width of 3rd antennal segment. Peristomal setae quite dense, especially posteriorly. In lateral view, vibrissal angle behind the level of profrons and epistoma concealed. Facial ridges densely setulose, to midway level of 3rd antennal segment or slightly higher. Mentum of proboscis dark brown. Palpi yellow, rather compressed, quite long-haired.

Thorax. Ground-colour black, the scutellum yellow on apical half or more. Mesonotum densely grey or ash-grey dusted with a conspicuous pattern of broad black undusted vittae as follows: a pair of vittae between *acr* and *dc*, clearly marked from neck to 2nd or 3rd *post dc*; a pair of spots between *prst dc* and *ph*; a pair of short vittae between anterior *post dc* and *ia*, and a pair of narrow vittae along posterior *post dc* rows. Pleura with little dust, matt. Scutellum dusted, concolourous with mesonotum but becoming thinner towards the tip which is undusted. Spiracles dark brown. All ground-setulae fine, those on mesonotum quite dense, especially long and dense in male. Setae strong. *Acr* setae not always paired. 3 *h*. 2 *ph*. 3 *ia*, the anterior one short and sometimes duplicated. 2 *sa*, both strong. *Pra* about half length of 2nd *npl*. Post-alar declivity with a tuft of setulae at middle. One propleural and 1 prostigmatal seta, each surrounded by numerous setulae but without auxiliary setae. Mesopleuron densely setulose almost all over, without a differentiated upper anterior setula. Notopleuron with 2 setae and almost entirely covered with setulae. Lower *stpl* closer to posterior than to anterior one, with some stronger setulae just in front of the two posterior setae. Hypopleuron long-haired below spiracle, and usually bare on metepisternum. Scutellum with 5 strong and moderate lateral pairs of setae and 1 strong apical pair. Disc densely setulose, several sub-lateral and subapical setae present.

Legs. Black. Fore femur without *av* setae, with a row of strong *pv* setae. Fore tibia usually with 2 submedian *p* setae, sometimes with only 1, and several erect *ad* setulae in apical half. Mid femur with rows of *av* and *pv* setae on basal half, that are stouter in female than in male. Mid tibia with 2–3 *p* setae. Hind femur with several fine *pv* setae in basal half, usually more hair-like in male than in female, and a complete row of *av* setae the basal ones of which are more hair-like, like the *pv* setae; *ad* row complete; 1 short *d* and 0 *pd* preapical setae. Hind tibia with a row of short *pd* setae on apical half, none exceeding tibial depth, amongst which is the short calcar; with an almost complete row of *ad* setae; 3–5 *av* but 0 *pv*; *av* apical present.

Wings (Text-fig. 2). Clear, veins brown. Membrane quite extensively devoid of microtrichia on basal part; discal cell for example bare on basal third and with a bare strip extending along vein 5 almost to hind cross-vein. Basicosta orange, epaulet orange to brown. Costa setulose ventrally almost to the apex of vein 2, the spine inconspicuous. Small cross-vein placed midway between the points where *sc* and vein 1 enter costa. Hind cross-vein oblique, sinuate. Squamae creamy to dirty creamy; the margins and fringes yellow, margin and fringe of the upper one sometimes rather dark outside. Halteres and knob dark brown.

Abdomen. Black in ground-colour. Entirely covered with light grey to ash-grey dust; without vittae, but with a conspicuous and well-developed series of shifting pruinose patches on tergite 3–5. Without striking setae; tergites quite long-haired laterally and posteriorly.

Genitalia. 2 ♂ dissected (Transvaal, Cape Province): sternite 5 as in Text-fig. 4; cercal plate as in *indecora* (Text-fig. 6); surstylus as in Text-fig. 7; aedeagus as in Text-fig. 3. 3 ♀ dissected (India, Cape Province, Botswana): ovipositor as in Text-figs 8, 9; 3 oval or elongate-oval spermathecae.

Measurements. Length of body, 8·0–9·0 mm. Length of wing, 7·5–8·5 mm.

MATERIAL EXAMINED.

Muscina heterochaeta Villeneuve, lectotype ♀, ZAMBIA: Chilanga, in house, 31.vii. 1913 (*R. C. Wood*) (BMNH).

SENEGAL: 1 ♂, 1 ♀, Richard-Toll, dans les nids de *Lagonosticta* (MNHN). NIGERIA:

1 ♀, south, April (BMNH); 1 ♀, Zaria, Samaru, 12.ii.1969 (*J. C. Deeming*) (IAR); 1 ♂, Samaru, m.v. light trap, 26.vi–6.vii.1970 (*P. H. Ward*) (BMNH); 1 ♂, NW State, Mokwa, near cattle ranch, m.v. light, white sheet, 14–19.vii.1970 (*P. H. Ward*) (BMNH). CAMEROUN: 1 ♀, région de Dchang, plateaux volcaniques, 1400 m, 1923 (*Gromier*) (MNHN). ZAIRE: 1 ♀, Elisabethville, 8.viii.1912 (*J. Bequaert*) (MRAC) (paralectotype of *Muscina heterochaeta* Villeneuve); 1 ♂, Zambi (*van Saceghem*) (MRAC); 1 ♀, Uelé, Angu, nid d'hirondelle (*J. Rodhain*) (MRAC); 1 ♀, Vieux-Kilo, ix. 1935 (*R. P. Thalmann*) (MRAC); 1 ♀, Leopoldville, larve sur *Passer diffusus* [= *griseus*], 1915 (*J. Rodhain*) (MRAC) (Rodhain & Bequaert, 1916). BURUNDI: 1 ♀, riv. Ruzizi, vii. 1934 (*van Saceghem*) (MRAC). SOUTH AFRICA: 2 ♂, Cape Province, Fort Beaufort, ex nest *Sigelus silens*, xi. 1948 (*J.S. Taylor*) (BMNH) (Taylor, 1949); 2 ♀, C.P., Highlands, larva collected from nest of Fiscal Shrike [*Lanius collaris*], i. 1948 (*C. J. Skead*) (BMNH); 1 ♂, 1 ♀, C.P., Highlands, ex nest *Serinus canicollis*, 8.xii.1948 (*J. S. Taylor*) (BMNH) (Taylor, 1949); 3 ♀, C.P., Highlands, ex nest *Lanius collaris*, i. 1948 (*J. S. Taylor*) (BMNH) (Taylor, 1949); 1 ♀, C.P., Colesberg, ex nest of Cape Sand Martin [*Riparia paludicola*], v. 1954 (MRAC); 2 ♂, 2 ♀, Transvaal, Pretoria, bred from larvae in nest of South African Cliff Swallow [*Petrochelidon spilodera*], 12–17.iv.1927 (*G. A. H. Bedford*) (BMNH). BOTSWANA: 1 ♀, Ghanzi, Mongalatsela, 1924 (*J. Maurice*) (BMNH). MALAWI: 1 ♀, Port Herald, iv–vi.1913 (*J. E. S. Old*) (BMNH) (Rodhain & Bequaert, 1916). ZAMBIA: 1 ♀, Mazabuka, 29.xii.1931 (*A. M. Alston*) (BMNH). TANZANIA: 1 ♂, Udjidji, 1918 (*J. Rodhain*) (MRAC) (Rodhain, 1919); 4 ♂, Usambara, Nguelo (MCSN) (Bezzi, 1922); 1 ♂, Usambara, Neguelo (*H. Rolle*) (BMNH) (Bezzi, 1922). UGANDA: 1 ♂, Kampala, Mulago, on exuded eucalyptus resin, 4.ix.1936 (*E. G. Gibbins*) (BMNH).

INDIA: 1 ♀, Calcutta, 1.vi.1914 (*E. Brunetti*) (BMNH) (Emden, 1965); 1 ♂, Toliganj, near Calcutta, 18.ii.1905 (*E. Brunetti*) (BMNH) (Emden, 1965); 1 ♂, Lucknow, in barracks, ii. 1905 (*A. R. Aldridge*) (BMNH) (Emden, 1965); 2 ♂, 1 ♀, 1 uneclosed cocoon, Simla Hills, Kasauli, bred from crow's nest [*Corvus* sp.], 14.vi.1933 (*C. S. S.*) (BMNH) (Emden, 1965); 2 ♀, Nilgiri Hills, Moyar Camp, 2900 feet, iv & v. 1954 (*P. S. Nathan*) (CNC); 1 ♂, 1 ♀, Coonoor (*W. S. Patton*) (MCSN) (Patton, 1920). BURMA: 2 ♀, Shwegu Res., Bhamo, ex fruit of *Pentacme suavis*, 22 & 24.v.1929 (*D. J. Atkinson*) (BMNH) (Emden, 1965). CEYLON: 4 ♀, Suduganga, on window, 12.iv.1920, 19.v.1920, 21.vi.1923 and 24.vi.1923 (*R. Senior-White*) (BMNH) (Emden, 1965). CHINA: 4 ♂, 1 ♀, Canton (*Howard*) (MCSN) (Bezzi, 1922); 1 ♀, Kam-si, 1875 (*A. David*) (MNHN) (paralectotype of *Muscina heterochaeta* Villeneuve). SUMATRA: 2 ♂, 3 ♀, Fort de Kock, 920 m, bred from swallow's nest, i & v. 1924 (*E. Jacobson*) (ZM) (Malloch, 1928).

DISTRIBUTION. Widespread in the Ethiopian region. In addition to the localities listed above, it has been recorded from many localities in Zaire: Bambili (Rodhain, 1914); Angou Oueré, Bagbovo, Semio, Bwamanga, Soulou, Mamor, Boungou Nala, Thysville (Rodhain & Bequaert, 1916); Rhodesia: Balla Balla and R. Umzingware (Cuthbertson, 1932); Kenya: Mombasa Island (Villeneuve, 1915).

In the Oriental region it appears to be less widespread, and in addition to the material listed above it is recorded from India: Goilkera, Chota Nagpur (Senior-

White, 1930) and Pusa district (Patel *in* Fletcher, 1920); and from [Taiwan] Formosa (Séguy, 1937, quoted in Hennig, 1941). It has been erroneously recorded from Java (e.g. Séguy, 1935), probably because the Javanese *longicornis* (Stein) was assumed to be a synonym of *heterochaeta*.

BIOLOGY AND HOSTS. The larva of *heterochaeta* is an external parasite of nestling birds, lying on the body-surface and piercing the skin only with the head in order to suck blood. Occasionally it will even attack dead nestlings, sucking the body fluids and even penetrating the abdomen (Patton, 1920), and it has also been found living in the host's nostrils (Ledger, 1969). The most complete accounts of the life-cycle are by Rodhain & Bequaert (1916) and Rodhain (1919) who describe and illustrate the immature stages, and describe the host-parasite relationship, egg-laying, eclosion, duration of life-cycle, etc. Cuthbertson (1935; 1939) also describes the life-cycle and immature stages, and illustrates the latter. More recent summaries are given by Zumpt (1965) and Ledger (1969).

The known hosts are the following (see also p. 366): *Aquila rapax*, *Cinnyris cupreus*, *Colius striatus*, *Corvus* sp., *Cossypha caffra*, *Dendropicos fuscescens*, Hirundinidae sp., *Hirundo semirufa*, *H. senegalensis senegalensis*, *H. s. monteiri*, *Hirundo* sp., *Lagonosticta* sp., *Lamprocolius chalybaeus*, *Lanius collaris*, *Motacilla capensis*, *Passer domesticus*, *P. griseus*, *Petrochelidon spilodera*, Ploceidae sp., *Ploceus cucullatus collaris*, *P. velatus*, *Polemaetus bellicosus*, *Riparia paludicola*, *Serinus canicollis*, *Sigelus silens*, *Sitagra monacha*, *Spermestes cucullatus* and Sturnidae sp.

Passeromyia steini Pont

Muscina longicornis Stein, 1909 : 221. Lectotype ♀, JAVA (ZM), designated by Pont (1970*a* : 92) [examined]. [Secondary homonym of *Passeromyia longicornis* (Macquart, 1851).]
Muscina longicornis Stein; Meijere, 1918 : 21.
Muscina longicornis Stein; Stein, 1919 : 111.
Muscina longicornis Stein; Stein, 1920 : 68.
Passeromyia longicornis (Stein) Malloch, 1928 : 328 [in part].
[*Passeromyia longicornis* (Macquart); Patton, 1929 : 388. Misidentification.]
[*Passeromyia longicornis* (Macquart); ?Fuller, 1934 : 17. Probable misidentification.]
Passeromyia longicornis (Stein); Townsend, 1935 : 143.
Passeromyia longicornis (Stein); Townsend, 1937 : 63.
Larvae, Ward, 1938 : 160.
Larvae, Bryant, 1939 : 146.
Muscid larvae, Roberts, 1940 : 233, pl. 29.
Passeromyia new species, Hindwood, 1947 : 125–128.
[*Passeromyia longicornis* (Macquart); Hindwood, 1951*a* : 179. Misidentification.]
[*Passeromyia longicornis* (Macquart); Hindwood, 1951*b* : 126. Misidentication.]
Passeromyia sp., Bourke, 1957 : 207 [in part].
Passeromyia longicornis (Stein); Emden, 1965 : 196.
Passeromyia longicornis (Stein); Pont, 1968 : 173.
Passeromyia longicornis (Stein); Pont, 1970*a* : 92.
Passeromyia steini Pont, 1970*a* : 92. [Replacement name for *P. longicornis* (Stein, 1909).]

NOTES ON SYNONYMY. As with *longicornis* (Macquart) and *indecora*, the published records are mixed and contain many misidentifications. Outside Australia the species has been confused with *heterochaeta*, whilst in Australia it has been confused with *longicornis* and *indecora*. Stein's (1909; 1920) material has been studied and found to be correct. Malloch's (1928) series includes both *steini* and *heterochaeta*, whilst Patton's *longicornis* (Macquart) is in fact *steini*. Bourke's (1957) material consists of both *indecora* and *steini*.

This species was first transferred to *Passeromyia* by Bezzi (1922 : 37) who synonymised it with *heterochaeta*.

DIAGNOSIS. *P. steini* can be recognized by the bare post-alar declivity. *P. veitchi* is the only other species with this character, but it is confined to Fiji and has the wing-membrane entirely covered with microtrichia.

In addition, the male of *steini* differs strikingly from that of the other species by having sternite 2 covered with very dense short fine setae.

DESCRIPTION. *Head* (Text-fig. 1). Eyes with a few short sparse hairs, or almost bare; eye-facets of uniform width. Ocellar setae moderate. *Vte* strong, weaker than *vti* and twice as long as the adjacent post-ocular setulae. Parafrontalia and upper half of parafacialia light grey to yellowish grey pruinose, tending to be greyer in male and yellower in female; lower half of parafacialia, genae and all of occipital dilation brown pruinose; occiput with a light grey pruinose band along posterior eye-margin as far as occipital dilation. Interfrontalia dark brown to dark reddish brown in ground-colour. Parafrontalia quite broad, at middle of frons a parafrontale slightly less than (♂) or slightly more than (♀) width of 3rd antennal segment and one-quarter width of interfrontalia at this point. *Ori* strong and inclinate, 6–7 pairs with a few fine interstitials, on lower three-quarters of frons, the upper ones sometimes slightly proclinate; 2 reclinate pairs of *ors*; parafrontalia otherwise with numerous dense fine hairs and setulae from vertex to lunula. Interfrontalia on upper half with 1 or 2 pairs of inclinate setae, and numerous setulae and hairs covering most of interfrontal surface here. Basal 2 antennal segments reddish, more or less extensively darkened on disc; 3rd segment dark brown, narrowly reddish at base. Third antennal segment long, in frontal view about 5 times as long as 2nd segment and falling short of epistoma by about its own width. Parafacialia broad, at lunula twice as broad as width of 3rd antennal segment and broader than this segment throughout. Parafacialia and genae bare. Genae broad; the depth below lowest eye-margin equal to twice width of 3rd antennal segment. Peristomal setae quite dense, especially posteriorly. In lateral view, vibrissal angle behind the level of profrons and epistoma concealed. Facial ridges densely setulose, almost up to level of insertion of arista. Mentum of proboscis dark brown. Palpi varying from entirely orange to entirely black.

Thorax. Ground-colour black, including scutellum which is not pale at tip except sometimes in immature specimens. Mesonotum densely grey dusted, sometimes appearing bluish but more usually dull ash-grey, with weakly indicated darker dusted vittae between *prst dc* and *acr*, these sometimes extending a little after suture, and between *dc* and *ph* and *ia*. Pleura with little dust, matt. Scutellum dusted, concolourous with mesonotum. Spiracles dark brown. All ground-setulae black, fine, those on mesonotum quite dense. Setae strong. *Acr* not always paired. 3 *h*. 2 *ph*. 2 *ia*, the anterior one level with 2nd *post dc*. 2 *sa*, both strong. *Pra* about half length of 2nd *npl*, sometimes duplicated. Post-alar declivity bare. 1 propleural and 1 prostigmatal seta, each surrounded by numerous setulae but without auxiliary setae. Mesopleuron densely setulose almost all over, without a differentiated upper anterior setula. Notopleuron with 2 setae and almost entirely covered with setulae. Lower *stpl* closer to posterior than to anterior one, sometimes with some stronger setulae just in front of the two posterior setae. Hypopleuron long-haired below spiracle and bare on metepisternum. Scutellum with 3–5 strong and moderate lateral pairs of setae and 1 strong apical pair. Disc densely setulose, several sub-lateral and subapical setae present.

Legs. Black. Fore femur without *av* setae, with a row of strong *pv* setae. Fore tibia without *p* setae, but with several erect *ad* setulae in apical half. Mid femur with some strong *av* and *pv* setae on basal half, without setae on apical half. Mid tibia with 3 *p* setae, one of these rather *pv* of *p*. Hind femur with several fine *pv* setae on basal half, longer and denser in male than in female, and a complete row of *av* setae; *ad* row complete; 1 short *d* and 0 *pd* preapical setae. Hind tibia with a row of short *pd* setae on apical half, none exceeding tibial depth, amongst which is the short calcar; with an almost complete row of *ad* setae, several of which are very long in the male; 3–4 *av* but 0 *pv*; *av* apical present.

Wings. Clear, veins brown. Membrane quite extensively devoid of microtrichia on basal part; discal cell for example bare on basal half or rather less and with a bare strip extending along vein 5 almost to cross-vein. Basicosta orange, epaulet brown or orange. Costa setulose ventrally almost to the apex of vein 2, the spine inconspicuous. Small cross-vein placed midway between the points where *sc* and vein 1 enter costa. Hind cross-vein oblique, sinuate. Squamae whitish to creamy yellow, the fringe hairs of the upper one usually brown. Halteres brown to dark brown, knob black.

Abdomen. Black in ground-colour. Entirely covered with bluish dust, the hind margins of tergites 3–5 thinly so in male and this sex more rarely also with traces of a thinly dusted median vitta on tergite 3; hind margin of tergite 3 rather thinly dusted in female; without traces of shifting pruinose patches on tergites 4 and 5. Without striking setae; tergites quite long-haired laterally and posteriorly.

Genitalia. 2 ♂ dissected (Queensland and Western Australia): sternite 5 and cercal plate as in *indecora* (Text-figs 5, 6); surstylus and aedeagus as in *heterochaeta* (Text-figs 3, 7). 1 ♀ dissected (Canberra): ovipositor length and structure as in *heterochaeta* (Text-figs 8, 9); 3 spherical spermathecae.

Measurements. Length of body, 8·0–9·0 mm. Length of wing, 7·5–8·5 mm.

VARIATION. The colour of the palpi is rather variable in this species. In the male, nearly all the specimens seen have dark palpi with the extreme tips orange or yellow; a few have them half yellow and half dark, and a few entirely dark; none have them entirely yellow. In the female, an equal number of specimens have the palpi half yellow and half dark and entirely dark with only the extreme tips pale; a small number have them either wholly black or wholly yellow.

The Indian female is small; antennae almost wholly orange; parafrontalia and parafacialia golden and silvery pruinose, not brown.

MATERIAL EXAMINED.

Muscina longicornis Stein, lectotype ♀, JAVA: Batavia, xi. 1907 (*E. Jacobson*) (ZM).

INDIA: 1 ♀, Nilgiri Hills, Moyar Camp, iv. 1954 (*P. Nathan*) (CNC). MALAYA: 1 ♀, Kuala Lumpur, evening, 11.viii.1924 (*H. M. Pendlebury*) (BMNH). JAVA: 3 ♀, Batavia, xi. 1907 (*E. Jacobson*) (1 ZM & 2 ZMHU) (paralectotypes of *Muscina longicornis* Stein); 1 ♀, Semarang, ix–x. 1905 (*E. Jacobson*) (ZM); 1 ♀?, Soekaboemi, vi. 1926 (*E. Le Moult*) (BMNH). SUMATRA: 2 ♀, Fort de Kock, x & xi. 1913 (*E. Jacobson*) (ZM) (Stein, 1920); 1 ♂, 1 ♀, Fort de Kock, 920 m, 1924 & 1925 (*E. Jacobson*) (BMNH) (Malloch, 1928). BURU: 2 ♀, Station 4, on exudations and sap of citrus trees, 29.i.1922 (*L. J. Toxopeus*) (ZM) (Patton, 1929). NEW GUINEA: 1 ♀, western New Guinea, Star Mountains, Sibil Valley, 1245 m, Malaise-trap, 18.x–8.xi.1961 (*L. & S. Quate*) (BPBM). NEW HEBRIDES: 2 ♂, Tanna Is. (*E. Aubert de la Rüe*) (MNHN). AUSTRALIA: 6 ♂, 4 ♀, Western Australia, De Grey, west of 80-Mile Beach, 29.viii.1934 (*I. M. Mackerras*) (ANIC & BMNH); 2 ♂, 2 ♀, W.A., Wagerup, 20.xii. 1956 (*B. Clare*) (WAM); 1 ♀, W.A., Lansdowne Station via Derby, 8.ix.1964 (*R. Plumb*) (ANIC); 1 ♀, W.A., 34 miles E. of Cosmo Newbery Mission, 14.x.1960 (*Chinnick, McCabe & Corby*) (ANIC); 1 ♀, Northern Territory, Amadeus Basin, 1–3.viii. 1962 (*P. Ranford*) (ANIC); 1 ♀, N.T., Palm Valley, 3.xi.1962 (*H. E. Anderson*) (ANIC); 2 ♀, N.T., Alice Springs, 31.x.1962 (*H. E. Anderson*) (ANIC & BMNH); 1 ♀, N.T., 9 km N. of Kulgera, 1.x.1972 (*Z. Liepa*) (ANIC); 1 ♂, 2 ♀, N.T., 9·6 km N. of Finke River, Stuart Hwy, 3.x.1972 (*Z. Liepa*) (ANIC & BMNH); 1 ♀, Queensland, Townsville, in vehicle, 16.xii.1968 (*P. Ferrar*) (ANIC); 2 ♀, Q., 28 miles W. of Kihee, 12.xi.1949 (*S. J. Paramonov*) (ANIC & BMNH); 1 ♀, Q., near Nocundra, 13.xi.1949 (*S. J. Paramonov*) (ANIC); 1 ♂, 1 ♀, Q., Warri Border Gate – Naryilco, 3.xi.1949 (*S. J. Paramonov*) (ANIC); 3 ♂, 1 ♀, Q., Naryilco – Orientos, 4.xi.1949 (*S. J. Paramonov*) (ANIC & BMNH); 1 ♀, Q., Longreach, in house, 13.i.1972 (*G. Russell*) (ANIC); 1 ♂, Q., west of Brisbane, Moggill Farm, 25 m, Malaise-trap, 27.i–1.ii.1961 (*J. L. Gressitt*) (BPBM); 3 ♀, New South Wales, Lake George, 12.xii. 1950 (*K. R. Norris*) (ANIC & BMNH); 1 ♀, N.S.W., Moree, 19.xi.1917 (*W. W. Froggatt*) (ANIC); 1 ♂, N.S.W., 40 miles N. of Broken Hill, 19.xi.1949 (*S. J. Paramonov*) (ANIC); 2 ♂, N.S.W., Albury – Holbrook, 15.xii.1949 (*S. J. Paramonov*) (ANIC & BMNH); 1 ♂, N.S.W., near Bourke, 27.x.1949 (*S. J. Paramonov*) (ANIC); 1 ♂, N.S.W., Tibooburra, Cobham Lake, 17.xi.1949 (*S. J. Paramonov*) (ANIC); 2 ♂, N.S.W., Fowler's Gap, 19.xi.1949 (*S. J. Paramonov*) (ANIC & BMNH); 1 ♀, N.S.W., 8 miles N. of Peak Hill, 10–12.xii.1969 (*R. W. Matthews*) (ANIC); 3 ♀, N.S.W., Moree, Bottle Swallow nest [*Petrochelidon ariel*], 17.xii.1965 (*K. R. Norris & D. E. Havenstein*) (ANIC & BMNH); 1 ♂, N.S.W., Bogan River (SPHTM); 3 ♂, N.S.W., Gilgandra, ex nest of Fairy Martin [*Petrochelidon ariel*], iii. 1941 (*P. Bourke*) (AM); 2 ♂, N.S.W., Gilgandra, ex nest material of *Merops ornatus*, 5.i.1942 (*P. Bourke*) (AM); 2 ♂, 6 ♀, N.S.W., Lane Cove, ex nest of Kookaburra [*Dacelo gigas*], xii. 1944 (*K. Hindwood*) (AM & BMNH) (Hindwood, 1947); 1 ♀, N.S.W., Woodford, Blue Mts, 23.xi.1972 (*G. B. Fairchild*) (ANIC); 1 ♂, 3 ♀, N.S.W., 'Oakdale', Sutton, 2, 21 & 28.xi.1972 (*R. J. Kitching*) (ANIC & BMNH); 8 ♀, Australian Capital Territory, Canberra, ex trap, xi. 1930 (*M. J. Mackerras*) (ANIC & BMNH); 1 ♂, 1 ♀, A.C.T., Canberra, bred out, 12.ii.1931 (ANIC); 1 ♀, A.C.T., Canberra, 22.iv.1952 (*S. J. Paramonov*) (ANIC); 1 ♀, A.C.T., Canberra, bred out from maggots collected in bird burrows, 12.ii.1931 (*G. Hill jun.*) (ANIC); 1 ♂, A.C.T., Canberra, collected in ?parrots burrow [Psittaciidae] (*G. Hill jun.*) (ANIC); 2 ♀, A.C.T., Canberra, on windows, 4 & 10.xii.1971 (*P. Ferrar*) (ANIC); 1 ♀, A.C.T., 10 miles N.W. of Canberra, 29.xi.1950 (*K. R. Norris*) (ANIC); 1 ♀, A.C.T, Black Mt, in trap, 23.xi.1939 (ANIC); 2 ♀, Victoria, Donald (*L. C. Gotch*) (ANIC); 2 ♂, 1 ♀, V., Nth Kew, ex owl's nest [Strigiformes], 23 & 30.xii.1940 (*C. Bryant*) (AM); 14 ♂, 8 ♀, V., Cranbourne, larvae from Rosella nest [*Platycercus eximius*], em 20.xii. 1939 (*N. L. Roberts*) (ANIC, SPHTM, AM & BMNH) (Roberts, 1940; Hindwood, 1947); 2 ♂, 1 ♀, V., Rye, 16.i.1973 (*E. A. Fonseca*) (BMNH); 2 ♀, South Australia, Sleaford Bay, Pt Lincoln, 27.xi.1958 (*J. Casanova*) (ANIC & BMNH); 1 ♀, S.A., 17 miles S.W. by W. of Port Augusta, 32°39′ S., 137° 32′ E., 28.x.1969 (*K. H. L. Key & M. S. Upton*) (ANIC); 1 ♀, S.A., Old Alton Downs, Simpson Desert, 19.ix. 1972

(*Z. Liepa*) (ANIC); 1 ♀, S.A., Mt Barr, 24 km S.S.E. of Abminga, 25.ix.1972 (*Z. Liepa*) (ANIC).

Distribution. South India, Malaya, Sumatra, Java, Buru, west New Guinea, Australia and New Hebrides. Also recorded from Palawan Island in the Philippines (Pont, 1968).

In Australia recorded from all states except for Tasmania, and most common in the south-east. It is less abundant in collections than *indecora*.

Biology and hosts. The published accounts of the life-history of *longicornis* (Macquart) refer to both *steini* and *indecora* (see Introduction, p. 347). It seems clear, however, that the larvae of *steini* live as scavengers in the nests of birds whilst those of *indecora* are subcutaneous parasites of the nestlings.

Hindwood (1947) published an account of the life-history of this species, the larvae of which he found feeding on food remains and excreta in the nest of *Dacelo gigas*. In the laboratory, larvae fed on raw meat, and Roberts (1940) reported that they devoured a dead nestling. The pupal stage lasted 17–28 days in one year (1944) and 10–12 days in the following year. Pupae were parasitized by a species of *Mormoniella* Ashmead (Pteromalidae), which oviposits in the prepupal larva, and by the Clerid beetle *Necrobia ruficollis* (Fabricius, 1775) which is usually a tertiary carrion species feeding on dried tissue, etc. Hindwood found the adults sluggish but strongly attracted to the nesting chambers of *Dacelo*. He dissected 3 gravid females, which contained 65, 52 and 9 ovarian eggs.

The known hosts are the following (see also p. 366): *Dacelo gigas*, *Gymnorhina tibicen*, *Merops ornatus*, *Platycercus eximius*, Psittaciidae sp., *Petrochelidon ariel* and Strigiformes sp.

Passeromyia indecora (Walker)

(Text-figs 1, 5, 6)

Morellia indecora Walker, 1858 : 215. Holotype ♀, Australia: New South Wales (BMNH) [examined].

Ornithomusca victoria Townsend, 1916 : 45. Holotype ♂, Australia: Victoria (USNM) [not examined: see below]. [Synonymy by Emden, 1965 : 194].

Morellia indecora Walker; Stein, 1919 : 109.

Larvae, Gilbert, 1919 : 48.

Larvae, Harvey & Harvey, 1919 : 40.

[*Passeromyia longicornis* (Macquart) Bezzi, 1922 : 31, in part. Misidentification.]

[*Passeromyia longicornis* (Macquart); ?Gilbert, 1923 : 116. Misidentification.]

[*Passeromyia longicornis* (Macquart); ?Hindwood, 1930 : 131 ff. Misidentification.]

Morellia indecora Walker; Séguy, 1935 : 111.

Ornithomusca victoria Townsend; Townsend, 1935 : 143.

Morellia indecora Walker; Séguy, 1937 : 394.

Ornithomusca victoria Townsend; Townsend, 1937 : 62.

[*Passeromyia longicornis* (Macquart); Elliot, 1938 : 42. Misidentification.]

[*Passeromyia longicornis* (Macquart); Gilbert, 1939 : 512. Misidentification.]

[*Passeromyia longicornis* (Macquart); Hindwood, 1947 : 127. Misidentification.]

[*Passeromyia longicornis* (Macquart); ?Chisholm, 1952 : 401. Misidentification.]

Passeromyia sp., Chisholm, 1952 : 401.
[*Passeromyia longicornis* (Macquart); ?Owen, 1954 : 239. Misidentification.]
Passeromyia sp., Bourke, 1957 : 207, in part.
Passeromyia indecora (Walker) Emden, 1965 : 93, 194.

NOTES ON TYPE-MATERIAL. The holotype of *indecora* is rather dirty and damaged: the antennae, left mid leg, left hind tarsi, right fore leg and right hind leg are missing.

This is the only Australian species of the genus with the combination of yellow palpi and densely hairy eyes, both of which characters are mentioned by Townsend in his original description of *victoria*. Dr R. J. Gagné (letter of 18 June, 1970) kindly checked Townsend's type and paratype against my key and confirmed my identification of this species. He wrote that 'the two specimens are not in good condition; in fact, between the two there was only one foreleg and one of its *p* setae is broken off at the base'.

NOTES ON SYNONYMY. *P. indecora* was incorrectly synonymized with the Calliphorid *Calliphora stygia* (Fabricius) by Osten-Sacken (1882). *P. victoria* was synonymized with *longicornis* (Macquart) by Bezzi (1922) who was followed by Malloch (1925), Hardy (1937), Séguy (1937) and Zumpt (1965), but was maintained as a distinct species by Townsend (1935; 1937).

One of Bezzi's (1922) two specimens of *longicornis* (Macquart) is this species; his second specimen, which was reared and was not from Tasmania, has not been found and could be *indecora* or *steini*. Bourke's (1957) material of *Passeromyia* sp. consists of both *indecora* and *steini*.

DIAGNOSIS. *P. indecora* is the only Australian species with yellow palpi and hairy eyes, but specimens occur with dark palpi and these differ from the Tasmanian *longicornis* (Macquart) by the paler squamae and parafacialia.

DESCRIPTION. *Head*. Eyes with long dense hairs which are equal to almost half width of 3rd antennal segment; eye-facets of uniform width. Ocellar setae moderate. *Vte* strong, slightly weaker than *vti* and twice as long as the adjacent post-ocular setulae. Parafrontalia yellowish grey, almost golden, pruinose, sometimes with a brown patch near lunula; parafacialia, face, genae and part of occipital dilation brown pruinose, parafacialia often silvery or golden in less mature specimens; occiput with a light grey pruinose band along posterior eye-margin from vertex down on to occipital dilation. Interfrontalia reddish brown to dark brown in ground-colour. Parafrontalia quite broad, at middle of frons a parafrontale equal to (♂) or slightly broader than (♀) width of 3rd antennal segment and one-quarter width of interfrontalia at this point. *Ori* strong and inclinate, 5–7 pairs with a few fine interstitials, on lower three-quarters of frons, the upper ones becoming progressively more inclinate and proclinate; on upper one-quarter with 2 pairs of reclinate *ors*; parafrontalia otherwise with numerous dense fine hairs and setulae from vertex to lunula. Interfrontalia on upper one-half or two-thirds with 1 or 2 pairs of inclinate setae, and numerous setulae and hairs covering most of the interfrontal surface here. First and 2nd antennal segments reddish brown to brown; 3rd segment dark brown, sometimes narrowly reddish at base. Third antennal segment long, in frontal view a good 5 times as long as 2nd segment and almost reaching to epistoma. Parafacialia broad, at lunula twice as broad as width of 3rd antennal segment and broader than this segment throughout. Parafacialia and genae bare. Genae broad; the depth below lowest eye-margin equal to twice width of 3rd antennal segment. Peristomal setae quite dense, especially posteriorly. In lateral view, vibrissal angle behind the level of profrons and epistoma concealed. Facial ridges densely setulose, up to level of insertion of arista. Mentum of proboscis dark brown. Palpi usually yellow, sometimes partly brown or only yellow at tip or wholly brown; rather compressed, long-haired.

Thorax. Ground-colour black, scutellum yellow at tip. Mesonotum densely grey dusted, appearing bluish, with scarcely any indication of vittae but with some lines of darker dust between *prst dc* and *acr*, and between *dc* and *ph* and *ia*. Pleura with little dust, matt. Scutellum dusted, concolourous with mesonotum but becoming thinner towards the tip which is undusted. Spiracles dark brown. All ground-setulae black, fine, those on mesonotum quite dense. Setae strong. *Acr* setae not always paired. 3 *h*. 2 *ph*. 3 *ia*, but sometimes only 2 present on each side. 2 *sa*, both strong. *Pra* slightly shorter than 2nd *npl*. Post-alar declivity with a tuft of setulae at middle. One propleural and 1 prostigmatal setae, each surrounded by numerous setulae but without auxiliary setae. Mesopleuron densely setulose almost all over, without a differentiated upper anterior setula. Notopleuron with 2 setae and almost entirely covered with setulae. Lower *stpl* closer to posterior than to anterior one, often with some stronger setulae just in front of the two posterior setae. Hypopleuron long-haired below spiracle and usually haired on metepisternum. Scutellum with 4–5 strong and moderate lateral setae and 1 strong apical pair. Disc densely setulose, several sub-lateral and subapical setae present.

Legs. Black. Fore femur without *av* setae, with a row of strong *pv* setae. Fore tibia usually with 2 submedian *p* setae, but sometimes only 1 present, and several erect *ad* setulae in apical half or along entire length. Mid femur with rows of *av* and *pv* setae that are longer and stronger towards base, shorter and weaker towards apex. Mid tibia with about 5 setae on the *p* surface and slightly *v* of *p*. Hind femur with several fine *pv* setae on basal half, longer in male than in female, and a complete row of *av* setae; *ad* row complete; 0–1 short *d* and 0 *pd* preapical setae. Hind tibia with a row of short *pd* setae on apical half or more, none exceeding tibial depth, amongst which is a short calcar; with an almost complete row of *ad* setae; 3–5 *av* setae, but 0 *pv*; *av* apical present.

Wings. Clear, veins brown. Membrane quite extensively devoid of microtrichiae on basal part; discal cell for example bare on basal half or less and with a bare strip extending along vein 5 almost to hind cross-vein. Basicosta and epaulet orange. Costa setulose ventrally almost to the apex of vein 2, the spine inconspicuous. Small cross-vein placed midway between the points where *sc* and vein 1 enter costa. Hind cross-vein oblique, sinuous. Squamae creamy, margin and fringe of upper one often partly darkened. Halteres brownish to dark brown, knob black.

Abdomen. Black in ground-colour. Entirely covered with bluish dust; without any vittae or pattern, but with very weak indications of shifting pruinose patches on tergites 4 and 5, and tergites 3 and 4 with dark undusted hind-margins. Without striking setae; tergites quite long-haired laterally and posteriorly.

Genitalia. 2 ♂ dissected (Queensland and New South Wales): sternite 5 and cercal plate as in Text-figs 5, 6; surstylus and aedeagus as in *heterochaeta* (Text-figs 3, 7). 2 ♀ dissected (Western Australia and Australian Capital Territory): ovipositor length and structure as in *heterochaeta* (Text-figs 8, 9); 3 oval spermathecae.

Measurements. Length of body, 7·5–8·5 mm. Length of wing, 7·0–8·0 mm.

VARIATION. This is rather a variable species in several respects, but the available material, which includes bred series from single nests, indicates that only one species is involved. The principal variation is found in the *ia* setae (usually 3; sometimes 2 or 2 + 3 setae; occasionally 4); the palpi (usually wholly yellow; sometimes wholly brown, or partly brown with yellow tips); *p* setae on fore tibia (usually 2; sometimes only 1 on each side); margin of upper squama (usually creamy; sometimes partly brown); parafrontal and parafacial pruinosity (silvery or slightly golden, through to brown or partially dark brown; sometimes a dark patch just before lunula); and metepisternum (usually haired; a few specimens bare).

When viewed in certain lights, the palpi of the holotype of *indecora* appear pale in apical part (all that is visible), but close study shows that the ground-colour is dark and that they have faded or become rather translucent with age.

The female from Fiji agrees well with Australian material, but the mesonotum is ash-grey dusted and the abdominal dust too tends towards the ash side of blue.

MATERIAL EXAMINED.

Morellia indecora Walker, holotype ♀, AUSTRALIA: New South Wales, no further data (BMNH).

FIJI: Viti Levu: 1 ♀, Colo-i-Suva, Malaise-trap, 3–6.iii.1963 (*C. Yoshimoto*) (BPBM). AUSTRALIA: 1 ♂, Western Australia, Cranmore Park, 12.xi.1933 (*Fuller*) (ANIC); 1 ♀, W.A., Crawley, 30.x.1934 (*K. R. Norris*) (ANIC); 1 ♀, W.A., Wyndham, 10.viii. 1953 (*R. Lukins*) (ANIC); 2 ♀, W.A., Perth, 29.x and 6.xi.1967 (*H. E. Paterson*) (HEP); 1 ♀, Northern Territory, 9 km N. of Kulgera, 1.x.1972 (*Z. Liepa*) (ANIC); 1 ♂, N.T., 3 km N.N.E. of Erldunda HS, Stuart Hwy, 2.x.1972 (*Z. Liepa*) (ANIC); 1 ♂, N.T., 44–45 km N.E. of Andado HS, Simpson Desert, 29.ix.1972 (*Z. Liepa*) (ANIC); 14 ♂, Queensland, near Nocundra, 10.xi.1949 (*S. J. Paramonov*) (ANIC & BMNH); 1 ♀, Q., Cairns, ex window (*J. F. Illingworth*) (BPBM); 6 ♂, 3 ♀, Q., Corella R, 19°35′ S., 140°51′ E., Normanton Julia Creek Road, reared from larvae ex young and nests of Fairy Martins [*Petrochelidon ariel*], 26.x.1972 (*A. L. Dyce*) (ANIC & BMNH); 55 ♂, 9 ♀, Q., Talwood, bred from pupae in nest of Welcome Swallow [*Hirundo neoxena*], 29.x.1972 (*A. L. Dyce*) (ANIC & BMNH); 3 ♂, 3 ♀, New South Wales, Marrar, as pupae in nest of Fairy Martin [*Petrochelidon ariel*], 23.xii.1959 (*A. L. Dyce*) (BMNH & ANIC); 1 ♂, 2 ♀, N.S.W., Beecroft, larvae from sparrow's nest [*Passer* sp.], em 22.xii.1939 (*N. L. Roberts*) (ANIC); 1 ♂, N.S.W., Lake George, from larvae in nest of *Petrochelidon ariel*, xii.1950 (*K. R. Norris*) (ANIC); 12 ♂, N.S.W., Lake George, from nest of swallow [Hirundinidae], xii. 1950 (*Spence & Norris*) (ANIC & BMNH); 1 ♀, N.S.W., Milson Island, feeding on Bluegum Marina, 19.xii.1909 (*J. B. Cleland*) (BMNH); 1 ♀, N.S.W., Roseville, Sydney, 2.ii. 1916 (MCSN) (Bezzi, 1922); 3 ♂, 5 ♀, N.S.W., Gilgandra, ex nest of Fairy Martin [*Petrochelidon ariel*], iii. 1941 (*P. Bourke*) (AM & BMNH); 3 ♂, N.S.W., Gilgandra, ex nest of Fairy Martin [*Petrochelidon ariel*], 3.i.1942 (*P. Bourke*) (AM); 2 ♂, 1 ♀, N.S.W., National Park, larvae ix. 1937, adults x. 1937, RAOU 498 [*Hylacola pyrrhopygia*] (*P. A. Gilbert*) (AM) (Gilbert, 1939); 1 ♂, N.S.W., Waterfall, 31.viii.1924 (*P. A. Gilbert*) (AM); 1 ♀, N.S.W., Waterfall, larvae from nestling *Ptilotis* [= *Meliphaga*] *leucotis*, 31.viii.1924 (*P. A. Gilbert*) (AM); 1 ♀, N.S.W., no locality, larvae from nestling *Gliciphila fulvifrons* [= *melanops*] (*P. A. Gilbert*) (AM); 5 ♂, 2 ♀, N.S.W., Mungindi, nest of Chestnut-tailed Thornbill [*Acanthiza uropygialis*], em 30–31.x.1937 (*A. J. Elliot*) (AM & BMNH); 1 ♂, N.S.W., Cranebrook, near Penrith, from nest of *Acanthiza lineata*, 11.x.1950 (*K. A. Hindwood*) (ANIC); 1 ♀, N.S.W., Meroo Meadow, 7.xii.1926 (*B. Bertram*) (AM); 1 ♀, N.S.W., A.M. yard from nestling sparrow [*Passer* sp.], em 19.i.1966 (*R. Lossin*) (AM); 12 ♀, N.S.W., National Park, ex larvae in lyre bird [*Menura superba*], 1.ix.1931 (*K. Hindwood*) (AM & BMNH); 5 ♀, N.S.W., National Park, ex lyre bird [*Menura superba*], 26.ix.1931 (*K. Hindwood*) (AM & BMNH); 14 ♀, N.S.W., Marley, National Park, 27.i.1930 (*K. A. Hindwood*)

(AM, MNHN & BMNH); 2 ♀, N.S.W., Wollstonecraft, gasworks area, from nest of spice finch [*Lonchura punctulata*], em 14.iv.1940 (*K. A. Hindwood*) (AM); 6 ♀, N.S.W., Wollstonecraft, ex nest of spice finch, em 18 & 22.iv and 1.v.1950 (*K. Hindwood*) (AM & BMNH); 1 ♂, N.S.W., Dee Why Swamp, from nest of *Megalurus timoriensis*, xii. 1949 (*K. Hindwood*) (AM); 5 ♀, N.S.W., Chatswood, from nest of Red-browed finch [*Aegintha temporalis*], 17.vi. 1950 (*K. Hindwood*) (AM & BMNH); 4 ♀, N.S.W., mangroves above Roseville Bridge, from vacant nest and dead body of young *Myiagra rubecula*, 3–7.ii.1940 (*K. A. Hindwood*) (AM) (Hindwood, 1947); 16 ♂, 16 ♀, N.S.W., Cambewarra, bred from nest of *Strepera graculina*, 18–27.xi.1940 (*K. Hindwood*) (AM & BMNH); 33 ♂, N.S.W., near Narrabeen Lakes, pupae in nest-lining of *Centropus phasianinus*, em 12–18.xi.1941 (*K. Hindwood*) (AM & BMNH); 1 ♀, N.S.W., Murrumbateman, 22.vii.1972 (*D. E. Havenstein*) (ANIC); 1 ♀, Australian Capital Territory, Canberra, on windows, 4.xii.1971 (*P. Ferrar*) (ANIC); 1 ♂, A.C.T., Black Mt, light trap, 26.i.1954 (*P. Sinclair*) (ANIC); 1 ♂, 3 ♀, A.C.T., 10 miles N. of Canberra, pupae in Fairy Martin nest [*Petrochelidon ariel*], xii. 1950 (*K. R. Norris*) (ANIC & BMNH); 1 ♂, A.C.T., Gungahlin, nestling magpie [Cracticidae], em 18.xi.1958 (*R. Carrick & A. L. Dyce*) (ANIC); 2 ♀, South Australia, Sleaford Bay, early xii. 1959 (*J. Casanova*) (ANIC); 9 ♀, no locality (presumably N.S.W.), pupae from nest of *Centropus phasianinus*, em 25–27.iii.1950 (*K. Hindwood*) (AM & BMNH).

DISTRIBUTION. Australia and Fiji.

In Australia recorded from all states except for Tasmania, and most abundant in the south-east.

BIOLOGY AND HOSTS. The published accounts of the life-history of *longicornis* (Macquart) probably refer to mixed series of *indecora* and *steini* (see Introduction, p. 347). It seems clear, however, that the larvae of *indecora* live as subcutaneous parasites of nestling birds, whilst those of *steini* live as scavengers in the nests.

The principal accounts are by Gilbert (1919) and Hindwood (1930), and I have tentatively referred their material to *indecora*. Eggs are laid under the wings of the nestling bird, and the young maggots disperse over the body before penetrating the skin. They feed subcutaneously on blood, and take 6 days to reach maturity. If the nestling dies, the larvae continue to feed in the carcase until ready to pupate. Pupation takes place in the nest-lining or, if the nest is not compact, beneath it, and the pupal stage lasts up to 15 days. Infestations are usually found in the autumn and winter months, and often result in the death of the host. The number of larvae per host can range from 1 to over 30 or possibly even more.

Hindwood (1947) found that puparia were parasitized by small Hymenoptera, presumably a species of *Mormoniella* Ashmead (Pteromalidae) such as he found parasitising puparia of *steini*.

The known hosts of *indecora* are the following: *Acanthiza lineata*, *A. uropygialis*, *Aegintha temporalis*, ?*Anthochaera chrysoptera*, ?*Anthus novaeseelandiae*, ?*Carduelis carduelis*, *Centropus phasianinus*, Cracticidae sp., *Gliciphila melanops*, Hirundinidae sp., *Hirundo neoxena*, *Hylacola pyrrhopygia*, *Lonchura punctulata*, *Megalurus timoriensis*, *Meliphaga leucotis*, *Menura superba*, *Myiagra rubecula*, ?*Pachycephala* *rufiventris*, *Pardalotus* sp., *Passer* sp., *Petrochelidon ariel*, ?*Phylidomyris niger*, ?*P. novaehollandiae*, ?*Rhipidura leucophrys* and *Strepera graculina*.

Passeromyia longicornis (Macquart)

Cyrtonevra longicornis Macquart, 1851*a* : 228; 1851*b* : 255; pl. 23, fig. 8. Holotype ♂, AUSTRALIA: Tasmania (MNHN) [examined].
Ornithomusca longicornis (Macquart) Townsend, 1916 : 45.
Cyrtoneura longicornis Macquart; Stein, 1919 : 111.
Passeromyia longicornis (Macquart); Malloch, 1925 : 46.
Passeromyia longicornis (Macquart); Malloch, 1928 : 328.
Ornithomusca longicornis (Macquart); Townsend, 1935 : 143.
Passeromyia longicornis (Macquart); Séguy, 1937 : 383.
Passeromyia longicornis (Macquart); Hardy, 1937 : 28.
Passeromyia longicornis (Macquart); McKeown, 1944 : 234.
Passeromyia longicornis (Macquart); Séguy, 1946 : 126.
Passeromyia longicornis (Macquart); Séguy, 1950 : 351.
Passeromyia longicornis (Macquart); Séguy, 1955 : 136.
Passeromyia longicornis (Macquart); Lee, Crust & Sabrosky, 1956 : 323.
Passeromyia longicornis (Macquart); Hicks, 1959 : 219.
Passeromyia longicornis (Macquart); Zumpt, 1965 : 40–41.
Cyrtoneura longicornis Macquart; Emden, 1965 : 195.
Passeromyia longicornis (Macquart); Norris *in* CSIRO, 1970 : 121.

NOTE ON SYNONYMY. Since *longicornis* (Macquart) has for so long been confused with other species, virtually all the published records refer to different species. Outside Australia (Patton, 1929), records refer to *steini*. Inside Australia, since the species is restricted to Tasmania, records refer to *steini* or *indecora;* most of those that I have been able to check refer to *indecora*. Where I have been able to trace material on which the published records are based, reference is made to the misidentifications under each species. Almost all the remaining records listed above are unverified and are based upon one or several species other than *longicornis*, but in no case is it possible even to guess at what species is intended.

DIAGNOSIS. *P. longicornis* can be distinguished from the other species of *Passeromyia* by the very dark brown pruinosity on parafrontalia and parafacialia. It is confined to Tasmania.

DESCRIPTION. *Head.* Eyes with dense long hairs which are equal to almost half width of 3rd antennal segment; eye-facets of uniform width. Ocellar setae moderate. *Vte* strong, slightly weaker than *vti* and twice as long as the adjacent post-ocular setulae. Parafrontalia thinly dull brownish grey pruinose; parafacialia, face, genae and part of occipital dilation dark brown pruinose; occiput with a light grey pruinose band along posterior eye-margin from vertex down on to occipital dilation. Interfrontalia dark in ground-colour. Parafrontalia quite broad, at middle of frons a parafrontale slightly less than width of 3rd antennal segment and one-quarter width of interfrontalia at this point. *Ori* strong and inclinate, about 7 pairs with a few fine interstitials on lower three-quarters of frons, the upper ones rather more proclinate; on upper one-quarter with 2 pairs of reclinate *ors*; parafrontalia otherwise with numerous dense fine hairs and setulae from vertex to lunula. Interfrontalia on upper one-half or two-thirds with 1 or 2 or more pairs of inclinate setae, and numerous setulae and hairs covering most of interfrontal surface here. Antennae dark brown, 2nd segment reddish dorsally at tip. Third antennal segment long, in frontal view over 5 times as long as 2nd segment and almost reaching to epistoma. Parafacialia broad, at lunula twice as broad as width of 3rd antennal segment and broader than this segment throughout. Parafacialia and genae bare. Genae broad; the depth below lowest eye-margin equal to twice width of 3rd antennal segment. Peristomal setae quite dense, especially posteriorly. In lateral view, vibrissal angle behind the level of profrons and epistoma concealed. Facial ridges densely setulose, up to level of insertion of arista. Mentum of proboscis dark brown. Palpi dark brown, rather compressed, long-haired.

Thorax. Ground-colour black, including scutellum which is not pale at tip. Mesonotum densely grey dusted, appearing bluish, with scarcely any indication of vittae but with some lines of darker dust between *prst acr* and *prst dc*, and between *dc* and *ph* and *ia*. Pleura with little dust, matt. Scutellum dusted, concolourous with mesonotum but becoming thinner towards the tip which is undusted. Spiracles dark brown. All ground-setulae black, fine, those on mesonotum quite dense. Setae strong. *Acr* setae not always paired. 3 *h*. 2 *ph*. 2 *ia*, a few females with the anterior one duplicated. 2 *sa*, both strong. *Pra* slightly shorter than 2nd *npl*. Post-alar declivity with a tuft of setulae at middle. One propleural and 1 prostigmatal seta, each surrounded by numerous setulae but without auxiliary setae. Mesopleuron densely setulose almost all over, without a differentiated upper anterior setula. Notopleuron with 2 setae and almost entirely covered with setulae. Lower *stpl* closer to posterior than to anterior one. Hypopleuron long-haired below spiracles; short-haired on metepisternum in type and some specimens, bare in most other specimens. Scutellum with 5 strong and moderate lateral pairs of setae and 1 strong apical pair. Disc densely setulose, several sub-lateral and subapical setae present.

Legs. Black. Fore femur without *av* setae, with a row of strong *pv* setae. Fore tibia with 1 submedian *p* seta, sometimes with a second one apicad of it in female, and several erect *ad* setulae in apical half. Mid femur with rows of *av* and *pv* setae that are longer and finer towards base, shorter and weaker towards apex. Mid tibia with 3 *p* setae. Hind femur with several fine *pv* setae on basal half, longer in male than in female, and a complete row of *av* setae; *ad* row complete; 1 short *d* and 0 *pd* preapical setae. Hind tibia with a row of short *pd* setae on apical half, none exceeding tibial depth, amongst which is the short calcar; with an almost complete row of *ad* setae; 3–5 *av* but 0 *pv*; *av* apical present.

Wings. Clear, veins brown. Membrane quite extensively devoid of microtrichia on basal part; discal cell for example bare on basal half or less and with a bare strip extending along vein 5 almost to hind cross-vein. Basicosta orange; epaulet dark brown, orange in some of the females (? immature). Costa setulose ventrally almost to the apex of vein 2, the spine inconspicuous. Small cross-vein placed midway between the points where *sc* and vein 1 enter costa. Hind cross-vein oblique, sinuate. Squamae dirty yellow, lower one smoky on outer quarter; margins and fringes dark brown. Halteres dark brown, knob black.

Abdomen. Black in ground-colour. Entirely covered with bluish dust; without any vittae or pattern, but with very weak indications of shifting pruinose patches on tergites 4 and 5. Without striking setae; tergites quite long-haired laterally and posteriorly.

Genitalia. 1 ♂ dissected (Mangalore): sternite 5 and cercal plate as in *indecora* (Text-figs 5, 6), surstylus and aedeagus as in *heterochaeta* (Text-figs 3, 7). 1 ♀ dissected (Antill Ponds): ovipositor length and structure as in *heterochaeta* (Text-figs 8, 9); 3 elongate sausage-shaped spermathecae.

Measurements. Length of body, 8·0–9·0 mm. Length of wing, 7·5–8·5 mm.

MATERIAL EXAMINED.

Cyrtonevra longicornis Macquart, holotype ♂, AUSTRALIA: Tasmania, no further data (MNHN).

AUSTRALIA: 1 ♂, Tasmania, Mangalore, 27.iv.1913 (*A. White*) (BMNH); 5 ♀, Tasmania, Antill Ponds, ex *Passer domesticus*, 20.iv.1959 (*R. H. Green*) (ANIC & BMNH).

DISTRIBUTION. Known only from Tasmania.

BIOLOGY AND HOSTS. Life-history unknown.

The only known host is *Passer domesticus.*

Passeromyia veitchi Bezzi

Passeromyia veitchi Bezzi, 1928 : 183. Holotype ♀, FIJI (BMNH) [examined].
Passeromyia veitchi Bezzi; Séguy, 1937 : 383.
Passeromyia veitchi Bezzi; Zumpt, 1965 : 41.
Passeromyia veitchi Bezzi; Pont, 1970*b* : 423.

NOTE ON TYPE-MATERIAL. In the holotype, the legs are missing except for the right mid leg, and both wings are broken off and gummed on to the data label.

DIAGNOSIS. *P. veitchi* is the only species of the genus with the wing-surface entirely covered with microtrichia, without any bare patches.

It can also be recognized by its striking appearance, because of the conspicuous dark vittae on mesonotum and the thinly dusted abdominal tergites.

DESCRIPTION. *Head.* Eyes bare; eye-facets of normal width. Ocellar setae moderate. *Vte* strong, slightly weaker than *vti* and twice as long as the adjacent post-ocular setulae. Parafrontalia rather thinly brownish golden pruinose; upper part of parafacialia, face and occipital dilation brownish golden pruinose, lower part of parafacialia and genae dark brown pruinose; occiput with a light grey pruinose band along posterior eye-margin from vertex down to occipital dilation. Interfrontalia dark in ground-colour. Parafrontalia quite broad, at middle of frons a parafrontale slightly less than width of 3rd antennal segment and one-quarter width of interfrontalia at this point. *Ori* strong and inclinate, 7–8 pairs with a few fine interstitials, on lower three-quarters of frons, the upper ones rather more proclinate; on upper one-quarter with 2 reclinate pairs of *ors*; parafrontalia otherwise with numerous dense fine hairs and setulae from vertex to lunula. Interfrontalia on upper half with 1 pair of strong inclinate setae, and with a few setulae and hairs on this part of interfrontal surface. First and 2nd antennal segments reddish, rather infuscated on disc; 3rd segment dark brown, narrowly reddish at base. Third antennal segment long, in frontal view just over 4 times as long as 2nd segment and almost reaching to epistoma. Parafacialia broad, at lunula twice as broad as 3rd antennal segment and broader than this segment throughout. Parafacialia and genae bare. Genae broad; the depth below lowest eye-margin equal to twice width of 3rd antennal segment. Peristomal setae quite dense, especially posteriorly. In lateral view, vibrissal angle behind the level of profrons and epistoma concealed. Facial ridges densely setulose almost up to level of insertion of arista. Mentum of proboscis dark brown. Palpi dark brown, rather compressed, long-haired.

Thorax. Ground-colour black, including scutellum which is not pale at tip. Mesonotum densely brownish grey or golden grey dusted with a conspicuous pattern of broad black undusted vittae as follows: a pair of vittae between *acr* and *dc*, clearly marked from neck to well behind suture and continuing more weakly almost to scutellum; a pair of spots between *prst dc* and *ph*, and a pair of vittae between *post dc* and *ia*. Pleura weakly brown dusted, not appearing matt. Scutellum dusted, concolourous with mesonotum, with a broad dark brown median mark that is broader at base than at apex. Spiracles dark brown. All ground-setulae black, fine, those on mesonotum quite dense. Setae strong. *Acr* setae not always paired. 3 *h*. 2 *ph*. 1 *ia*, level with 3rd *dc*. 2 *sa*, both strong. *Pra* just over half length of 2nd *npl*. Post-alar declivity bare. One propleural and 1 prostigmatal seta, each surrounded by numerous setulae but without auxiliary setae. Mesopleuron densely setulose all over, with 2 stronger setulae in upper anterior corner. Notopleuron with 2 setae and almost entirely covered with setulae.

Lower *stpl* closer to posterior than to anterior one, with some stronger setulae just in front of the two posterior setae. Hypopleuron bare below spiracle and with a few hairs on metepisternum. Scutellum with 5 strong and moderate lateral pairs of setae and 1 strong apical pair. Disc densely setulose, several sub-lateral and subapical setae present.

Legs. Mid femur with rows of *av* and *pv* setae on basal half, the *pv* rather stout. Mid tibia with about 4 *p* setae, 1 of which is rather *v* of *p*.

Wings. Clear, strikingly yellow at base, veins brown to yellowish brown. Membrane entirely covered with microtrichia, without bare patches. Basicosta orange, epaulet orange or brown. Costa setulose ventrally almost to the apex of vein 2, the spine inconspicuous. Small cross-vein placed midway between the points where *sc* and vein 1 enter costa. Hind cross-vein oblique, sinuate. Squamae yellow, the point of articulation between upper and lower ones deeper. Halteres yellow, knob orange.

Abdomen. Black in ground-colour. Appearing matt black in dorsal view; in posterior view with bluish dust that is thin or almost absent on the posterior part of tergite 3 and on all of tergite 4. Without striking setae; tergites quite long-haired laterally and posteriorly.

Genitalia. Not studied.

Measurements. Length of body, 8·5 mm. Length of wing, 8·0 mm.

MATERIAL EXAMINED.

Passeromyia veitchi Bezzi, holotype ♀, FIJI: Natova, 1916 (*R. Veitch*) (BMNH).

DISTRIBUTION. Known only from Fiji, from the holotype.

BIOLOGY AND HOSTS. Unknown.

Cyrtoneura pruinosa Wulp

Cyrtoneura pruinosa Wulp, 1880 : 176. Syntypes 3 ♀, JAVA (lost; see Pont, 1970*a* : 100).
Morellia pruinosa (Wulp) Stein, 1919 : 109.
Morellia pruinosa (Wulp); Séguy, 1935 : 113.
Morellia pruinosa (Wulp); Séguy, 1937 : 394.
Cyrtoneura pruinosa Wulp; Pont, 1970*a* : 100.

C. pruinosa was described from 3 females from Java, but unfortunately the types are lost (Pont, 1970*a*).

The species probably belongs to the genus *Passeromyia* and not to *Morellia* Robineau-Desvoidy, since the description hardly fits any of the known Indonesian *Morellia*. According to the description it has some characters of both *heterochaeta* and *steini*, and so cannot be identified specifically. It is compared with *Muscina stabulans* (Fallén) by Wulp and the thorax is stated to be ash-grey dusted, which agrees with *heterochaeta*. However, the abdomen is bluish dusted, the cheeks are brown below, and the palpi are dark, which agrees well with *steini*.

HOST-PARASITE LIST

The following list contains all the recorded hosts of *Passeromyia* and also includes the new hosts from material I have seen. The identity of the parasites in Australia is given only where I have seen the material or where sufficient taxonomic information is given to facilitate identification from the literature; in other cases the parasite is given with a query or left as 'sp.'

Orders, families and genera of birds are listed alphabetically. The nomenclature of the Australian birds was checked from Anonymous (1969), and the whole list has been reviewed by Dr I. C. J. Galbraith of the Zoological Museum, Tring.

HOST		REGION	PARASITE
COLIIFORMES			
Coliidae			
Colius striatus	Speckled Mousebird	Africa	*heterochaeta*
CORACIIFORMES			
Alcedinidae			
Dacelo gigas	Laughing Kookaburra, Laughing Jackass	Australia	*steini*
Meropidae			
Merops ornatus	Rainbow Bird, Bee-Eater	Australia	*steini*
CUCULIFORMES			
Cuculidae			
Centropus phasianinus	Pheasant Coucal	Australia	*indecora*
FALCONIFORMES			
Accipitridae			
Aquila rapax	Tawny Eagle	Africa	*heterochaeta*
Polemaetus bellicosus	Martial Eagle	Africa	*heterochaeta*
PASSERIFORMES			
Corvidae			
Corvus sp.	'Crow'	India	*heterochaeta*
Cracticidae			
–	'Magpie'	Australia	*indecora*
Gymnorhina tibicen	Black-Backed Magpie	Australia	*steini*
Strepera graculina	Pied Currawong	Australia	*indecora*
Dicaeidae			
Pardalotus sp.	Pardalote	Australia	*indecora*
Estrildidae			
Aegintha temporalis	Red-Browed Finch	Australia	*indecora*
Lonchura punctulata	Spice Finch	Australia	*indecora*
Fringillidae			
Carduelis carduelis	Goldfinch	Australia	?*indecora*
Serinus canicollis	Cape Canary	Africa	*heterochaeta*
Hirundinidae			
–	'Swallows'	Australia	*indecora*
		Africa	*heterochaeta*
		Indonesia	*heterochaeta*
Hirundo neoxena	Welcome Swallow	Australia	*indecora*
H. semirufa (= *gordoni*)	Rufous-Chested Swallow	Africa	*heterochaeta*
H. senegalensis monteiri	Mosque Swallow	Africa	*heterochaeta*
H. s. senegalensis	Mosque Swallow	Africa	*heterochaeta*
H. sp.	–	Africa	*heterochaeta*
Petrochelidon ariel	Fairy Martin, Bottle Swallow	Australia	*indecora*, *steini*
P. spilodera	South African Cliff Swallow	Africa	*heterochaeta*
Riparia paludicola	African Sand Martin	Africa	*heterochaeta*
Laniidae			
Lanius collaris	Fiscal	Africa	*heterochaeta*
Maluridae			
Acanthiza lineata	Striated Thornbill	Australia	*indecora*

HOST		REGION	PARASITE
A. uropygialis	Chestnut-Rumped Thornbill	Australia	*indecora*
Hylacola pyrrhopygia	Heath Wren	Australia	*indecora*
Meliphagidae			
Anthochaera chrysoptera	Little Wattle-Bird	Australia	?*indecora*
Gliciphila melanops (= *fulvifrons*)	Tawny-Crowned Honeyeater	Australia	*indecora*
Manorina melanocephala (= *Myzantha garrula*)	Noisy Miner	Australia	sp.
Meliphaga (*Ptilotis*) *leucotis*	White-Eared Honeyeater	Australia	*indecora*
Phylidonyris niger (= *Meliornis sericea*)	White-Chested Honeyeater	Australia	?*indecora*
P. (= *M.*) *novaehollandiae*	New Holland Honeyeater, Yellow-Winged Honeyeater	Australia	?*indecora*
Menuridae			
Menura superba (= *novaehollandiae*)	Superb Lyrebird	Australia	*indecora*
Monarchidae			
Myiagra rubecula	Leaden Flycatcher	Australia	*indecora*
Motacillidae			
Anthus novaeseelandiae (= *australis*)	Australian Pipit	Australia	?*indecora*
Motacilla capensis	Cape Wagtail	Africa	*heterochaeta*
Muscicapidae			
Sigelus silens	Fiscal Flycatcher	Africa	*heterochaeta*
Nectariniidae			
Cinnyris (= *Nectarinia*) *cupreus*	Copper Sunbird	Africa	*heterochaeta*
Pachycephalidae			
Pachycephala rufiventris	Rufous Whistler	Australia	?*indecora*
Ploceidae			
Ploceid	–	Africa	*heterochaeta*
–	'Weaver-Birds'	Africa	*heterochaeta*
Lagonosticta sp.	–	Africa	*heterochaeta*
Passer sp.	Sparrow	Australia	*indecora*
Passer domesticus	House Sparrow	Africa	*heterochaeta*
		India	*heterochaeta*
		Tasmania	*longicornis*
P. griseus (= *diffusus*)	Grey-Headed Sparrow	Africa	*heterochaeta*
Ploceus cucullatus collaris	Black-Headed Weaver	Africa	*heterochaeta*
P. velatus	Southern Masked Weaver	Africa	*heterochaeta*
Sitagra monacha	West-African Little Weaver	Africa	*heterochaeta*
Spermestes cucullatus	Bronze Mannikin	Africa	*heterochaeta*
Rhipiduridae			
Rhipidura leucophrys	Willie Wagtail	Australia	?*indecora*
Sturnidae			
–	'Starlings'	Africa	*heterochaeta*
Lamprocolius chalybaeus	Blue-Eared Glossy Starling	Africa	*heterochaeta*
Silviidae			
Megalurus timoriensis	Tawny Grassbird	Australia	*indecora*
Turdidae			
Cossypha caffra	Robin-Chat	Africa	*heterochaeta*
PICIIFORMES			
Piciidae			
Dendropicos fuscescens	Cardinal Woodpecker	Africa	*heterochaeta*

Host		Region	Parasite
PSITTACIFORMES			
Psittacidae			
–	'Parrots'	Australia	*steini*
Platycercus exmius	Eastern Rosella	Australia	*steini*
STRIGIFORMES			
–	'Owl'	Australia	*steini*

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M. C. DAY

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BY

MICHAEL CHARLES DAY

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SYNOPSIS

The limits of the subgenera of *Anoplius* are re-assessed to accommodate the Old World species more satisfactorily. Two subgeneric synonyms are newly established and a key to subgenera is provided. *Orientanoplius* is used as a subgenus for the first time. Five species of this subgenus are revised and a sixth described as new. Distributional and biological data are summarized and a key to species provided. Lectotypes are designated for ten nominal species and fifteen specific synonyms are newly established. Seven nominal species are transferred from *Orientanoplius* to *Anoplius* s. str., and one specific synonym newly established in *Notiochares*.

INTRODUCTION

THE genus *Anoplius* Dufour is considered to be a natural group of Pompilini of cosmopolitan distribution. Evans (1951; 1966) has revised the species of North and Central America, where the genus is especially well represented. Evans was first to employ a satisfactory subgeneric framework for groups of close affinity within the genus. Haupt (1929) dealt with certain Old World species; Arnold (1937) gave a key to females of some Ethiopian species. Wolf (1963) revised the western

Palaearctic species, following Evans in the employment of subgenera. No comprehensive accounts of the Old World fauna have been produced, although many species have been described and some genera proposed in a variety of faunal works.

Haupt (1935) proposed *Orientanoplius* as a genus for certain species of *Anoplius* from the Oriental region, whilst retaining *Anoplius* for some other species. Most of the species that Haupt placed in *Orientanoplius* are in fact members of *Anoplius* s. str. (new combinations are herein published). However, the type-species of Haupt's genus belongs to a natural group of Oriental and Ethiopian species which are well differentiated within *Anoplius* s. l., and for which I believe the use of *Orientanoplius* as a subgenus is justified. Subsequently, Haupt (1950) proposed *Africanoplius* as a genus for the Ethiopian species which are here considered to be members of *Orientanoplius*.

It is the purpose of this paper to revise the species of this small group, since most other Old World species of *Anoplius* s. l. are assignable to defined subgenera which may be revised satisfactorily as separate entities. It is envisaged that subsequent publications will complete this work.

There remain some isolated species of Old World Pompilini of restricted geographical occurrence (e.g. *Tagalochares plutonis* Banks, 1934, from the Philippines) which are not at present assigned to *Anoplius* s. l., but which may be when better studied. In most such instances, males are not yet known.

I have largely followed the terminology of Evans (1951; 1966) throughout, including his standard abbreviations of morphological terms; for convenience, those used in this paper are here repeated.

MID: middle interocular distance (maximum distance between eyes)
OOL: ocello-ocular line
POL: postocellar line
SGP: subgenital plate
SMC: submarginal cell
TFD: transfacial distance (width of head)

Depositories in which collections studied are housed are herein abbreviated as follows.

AM	Albany Museum, Grahamstown, Cape Province, Republic of South Africa.
ANIC	Australian National Insect Collection, Canberra, Australia.
ANS	Academy of Natural Sciences of Philadelphia, Pennsylvania, U.S.A.
BMNH	British Museum (Natural History), London.
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium.
MCZ	Museum of Comparative Zoology, Boston, U.S.A.
MHN	Muséum d'Histoire Naturelle, Geneva, Switzerland.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin, East Germany.
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium.
NM	Naturhistorisches Museum, Vienna, Austria.
NMSR	National Museum of Southern Rhodesia, Bulawayo, Rhodesia.
NR	Naturhistoriska Riksmuseum, Stockholm, Sweden.
RNH	Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands.
TM	Transvaal Museum, Pretoria, Transvaal, Republic of South Africa.
UM	University Museum, Oxford, United Kingdom.

USNM United States National Museum, Washington, U.S.A.
ZM Zoologisches Institut, Martin-Luther-Universität, Halle an der Saale, East Germany.
coll.Wahis Private collection of Monsieur R. Wahis, Chaudfontaine, Belgium.

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Genus *ANOPLIUS* Dufour

Psammochares Latreille, 1796 : 115. Type-species: *Sphex fusca* Linnaeus, 1761, by subsequent designation (Latreille, 1803 : 158). [Suppressed by I.C.Z.N. Opinion 166, 1945.]
Anoplius Dufour, 1834 : 483. Type-species: *Sphex nigerrimus* Scopoli, 1763, by subsequent designation (Van der Vecht & Menke, 1968 : 120). [Ratified by I.C.Z.N. Opinion 997, 1973.]

The diagnosis given by Evans (1966 : 214) requires modification in some particulars to accommodate the species of the Old World. That reproduced below is otherwise a transcription of Evans' diagnosis.

♀ ♂. Length 3–30 mm. Colour predominantly black, some species with abdomen partly or wholly reddish, a few with more or less red-brown coloration on head, thorax and legs; sometimes also with more or less pale yellow, more particularly in males, most frequently on the posterior pronotal margin. Apical tergite of female with at least a few stiff, backward directed bristles, often densely bristly. Mandibles with one or two teeth on inner margin. Labrum without a median slit, not or but slightly protruding from beneath clypeus, the latter truncate or emarginate. Malar space very short. Antennae elongate, segment three in female at least three times as long as wide. Pronotum rather short, without a median impression. Postnotum a transverse band of variable width, never expanded on each side of the median line. Propodaeum with smooth contours or with a well defined flat posterior declivity. Front tarsus of female with or without a comb; apical tarsal segment usually spined beneath but not always so. Claws of female usually dentate, occasionally bifid. Claws of male variable, usually markedly bifid with a strong tooth sub-equal in length to claw, occasionally dentate with a small but truncate tooth. Inner claws of male front tarsus either modified or not. Pulvillar comb strong, of from eight to twenty-four subparallel rays. Fore wing with three SMC's (rarely only two); hind wing with anal vein arching up to meet median vein at or slightly before cubital fork, occasionally slightly beyond; anal lobe at most half length of submedian cell. Male venter with or without tufts of hairs. Genitalia with basal hooklets single or absent, aedeagus simple and without spines or setae.

Females are readily recognized as generalized Pompilini with backward-directed bristles on the last tergite: males are best recognized by their possession of bifid claws and absence of other specialized features, or by the presence of distinct tufts or 'brushes' of hairs on the abdominal venter. In many instances (e.g. *Orientanoplius*), males do not conform well to any formal diagnosis, but present satisfactorily the overall facies of the genus.

Distribution. The subgenera *Anoplius* s. str. and *Arachnophroctonus* Howard are cosmopolitan, *Lophopompilus* Radoszkowski is holarctic. *Anopliodes* Banks, *Notiochares* Banks and *Cameronoplius* Evans are of more or less limited distribution in the New World tropics. *Orientanoplius* is confined to the Old World tropics.

Key to subgenera of *ANOPLIUS* occurring in the Old World

Females

1 Fore tarsus without a comb; i.e. the second tarsal segment without a spine on the outer side equal in length to that borne distally on the outer side of the segment **_ANOPLIUS_** Dufour (p. 378)

– Fore tarsus with a comb of short or fairly long spines; i.e. the second tarsal segment bears an additional spine at least equal in length to that borne distally on the outer side of the segment 2

2 Posterior margin of pronotum arcuate; head, thorax and abdomen with abundant erect hair; anterior margin of clypeus with distinct median emargination **_LOPHOPOMPILUS_** Radoszkowski

– Posterior margin of pronotum angulate or, rarely, arcuate: if arcuate, without abundant erect hair on head, thorax and abdomen; anterior margin of clypeus without median emargination 3

3 Ultimate tarsal segments without spines beneath **_ORIENTANOPLIUS_** Haupt (p. 380)

– Ultimate tarsal segments with spines beneath **_ARACHNOPHROCTONUS_** Howard (p. 379)

Males

1 SGP with large plumose process at base, which projects from emargination of preceding sternite . . . . **_LOPHOPOMPILUS_** Radoszkowski

– SGP without such a plumose process 2

2 Claws apparently dentate; tooth not parallel to claw, much reduced; without brushes of hairs on abdominal venter . . . . . **_ORIENTANOPLIUS_** Haupt (p. 380)

– Claws bifid: often with brushes of hairs on abdominal venter 3

3 Propodaeum, in profile, sloping evenly from front to rear, or gently rounded. Black or dark brown species, frequently with extensive grey or silvery pubescence. (One Ethiopian species with 3 or 4 pairs of orange maculae on abdominal tergites.) **_ANOPLIUS_** Dufour (p. 378)

– Propodaeum, in profile, with a more or less abrupt declivity, or strongly rounded. Black or dark brown species, usually with extensive red, red-brown, or orange maculae on first tergites (occasionally reduced to one or two pairs of small spots, or absent) . . . . . . **_ARACHNOPHROCTONUS_** Howard (p. 379)

Subgenus *ANOPLIUS* Dufour

Anoplius Dufour, 1834 : 483.

Anoplius s. str. is a large and rather diverse subgenus of cosmopolitan distribution, but well characterized by the absence of a tarsal comb in the female, correlated with a specialization towards the use of pre-existing cavities as nesting sites. In particular, many species of the subgenus exhibit a preference for waterside and intermittent watercourse habitats. Many species in the Old World tropics are assignable here; the following names, originally proposed in *Orientanoplius*, are new combinations in *Anoplius* s.l. and are all assignable to *Anoplius* s. str.:

Anoplius apicalis Haupt, 1938*b* : 46. (Junior secondary homonym of *Anoplius apicalis* Haupt, 1929. No new name is here proposed.) **Comb. n.**
Anoplius consimilis Haupt, 1941 : 76. **Comb. n.**
Anoplius melas Haupt, 1935 : 316. **Comb. n.**
Anoplius minutidens Haupt, 1941 : 79. **Comb. n.**
Anoplius niger Haupt, 1938*a* : 16. **Comb. n.**
Anoplius nitens Haupt, 1935 : 316. **Comb n.**
Anoplius obscuratus Haupt, 1938*b* : 45. **Comb. n.**

Subgenus *NOTIOCHARES* Banks

Notiochares Banks, 1917 : 107. Type-species: *Pompilus philadelphicus* Lepeletier, 1845 [=*Pompilus atramentarius* Dahlbom, 1843], by monotypy.

Anoplius (Notiochares) amethystinus exclusus (Smith)

Pompilus exclusus Smith, 1873 : 444. Holotype ♂, BRAZIL (BMNH) [examined].
Pompilus viridicatus Smith, 1879 : 143. Holotype ♀, 'WEST AFRICA' (BMNH) [examined]. **Syn. n.**
Anoplius viridicatus (Smith); Arnold, 1937 : 62.

Arnold (1937) redescribed the type of *P. viridicatus*, which is purported to be from West Africa. He was not familiar with the New World fauna, and did not recognize this common American pompilid The type-specimen may have been either a chance introduction to the West African coast or more probably was mislabelled at some stage subsequent to capture in the Americas. I have seen no African specimens taken since Arnold's redescription. Evans (1966) records the distribution of this subspecies as 'Windward Islands and Panama to Bolivia and N. Argentina'.

Subgenus *ARACHNOPHROCTONUS* Howard

Psammochares Latreille, 1796 : 115. Type-species: *Sphex fusca* Linnaeus, 1761, by subsequent designation (Latreille, 1803 : 158). Suppressed by I.C.Z.N. Opinion 166, 1945.]
Arachnophroctonus Howard, 1901 : pl. 7, figs 11, 14. Type-species: *Sphex tropicus* Linnaeus sensu Fabricius, 1775 (misidentification) [=*Psammochares marginalis* Banks, 1910], by subsequent designation (Pate, 1946 : 129).
Pompilinus Ashmead, 1902 : 85. Type-species: *Pompilus cylindricus* Cresson, 1867, by monotypy. **Syn. n.**

The subgeneric names *Arachnophroctonus* and *Pompilinus* have been applied to closely related groups of species in the New World, although Evans recognized them to be widely distributed in the Old World also. Wolf (1963) has used *Pompili-*

nus for Palaearctic species. Evans regards these as 'decidedly weak' entities (1966 : 302) and stated that they may not 'stand as discrete subgenera in the final analysis unless further characters are discovered to separate them' (Evans, 1951 : 278). Study of the Old World fauna reinforces this conclusion; species which appear to be closely related would be distributed to different subgenera on the basis of characters currently used.

More than a dozen Old World species are assignable to *Arachnophroctonus* in the broad sense here employed. The most common Old World species have previously been placed in *Pompilinus*.

Subgenus ***ORIENTANOPLIUS*** Haupt **stat. n.**

Orientanoplius Haupt, 1935 : 315 (as genus; proposed anew with same type-species, Haupt, 1938*a* : 16). Type-species: *Pompilus ignobilis* Saussure, 1867 [=*Pompilus canifrons* Smith, 1855], by original designation.

Africanoplius Haupt, 1950 : 40. Type-species: *Pompilus morosus* Smith, 1855, by original designation. **Syn. n.**

♀ ♂. Length 8–22 mm. Body colour black, with more or less grey pubescence, or various amounts of red-brown and yellow colouring; male pronotum margined posteriorly with yellow, sometimes obliterated by pale yellow-brown background or by silvery pubescence. With some strong erect hairs, particularly on front, temples, fore coxae, thoracic dorsum, propodaeum and abdominal venter. Wings infuscate, fusco-hyaline suffused with yellow, or yellow. Anterior margin of female clypeus transverse or concave. Front rather narrow. Pronotal hind margin angulate or arcuate. Fore tarsus with a comb of spines. Ultimate tarsal segments lack spines beneath. SMC3 of fore wing narrowed above, never petiolate. Male antenna in profile slightly to markedly crenulate. Terminal segment of male fore tarsus unmodified, claws more or less dentate rather than bifid (Text-fig. 28). Male venter without brushes or mats of hairs, SGP never flat, always folded longitudinally to a greater or lesser extent. Posterior margin of SGP always bordered by spines which are thicker than setae on ventral surface. Genitalia with basal hooklets well developed and single, or much reduced.

DISTRIBUTION. Widely distributed in forest, woodland and savanna areas of the Old World tropics, including Madagascar and Queensland, Australia. Absent from drier areas.

BIOLOGY. No information has previously been published for this group of *Anoplius*. What little is known is summarized under *A. canifrons*, *A. morosus* and *A. nigripes*.

INCLUDED SPECIES. Six species are here recognized as members of *Orientanoplius*, three in the Ethiopian region, one Malagasy, and two Oriental. They fall conveniently into two species-groups which correlate with geographical distribution, here called the *canifrons*-group (Oriental species) and the *morosus*-group (Ethiopian and Malagasy).

There is no doubt that Haupt correctly identified the nominal species he designated as type-species of *Orientanoplius;* a female of *A. canifrons* from Kandy, Ceylon, collected by Dr Enslin in 1929 and deposited in the collections of the ZM, Halle, bears Haupt's determination label '*Orientanoplius ignobilis* Sauss: det. Haupt 1932 ♀.'

KEY TO THE SPECIES OF *ORIENTANOPLIUS*

Females

1 Wings largely infuscate, normally with violaceous reflections. Body colour black, extensively covered with black or grey pubescence. Oriental region. (***canifrons***-group) . . . . (p. 382)

– Wings largely yellow, with varying amounts of infuscation apically. Body colour various proportions of black and red-brown, sometimes with yellow maculae. Ethiopian region. (***morosus***-group) 2

2 Clypeus (when head viewed perpendicular to front) with distinctly arcuate margin (Text-fig. 16). Posterior pronotal margin distinctly angulate (Text-fig. 13). Mesonotum with at least some red-brown coloration 3

– Clypeus transverse (Text-fig. 17). Posterior margin of pronotum weakly angulate or arcuate (Text-figs 14, 15). Mesonotum entirely black 4

3 Apical infuscation of forewing well defined, normally just entering distal tip of marginal cell. Mesonotum with a median wedge-shaped black area anteriorly, otherwise red-brown. Sixth tergite normally red-brown. Africa and Sao Thomé Island ***morosus*** Smith (p. 388)

– Apical infuscation less clearly defined, diffuse, rarely just entering distal tip of marginal cell. Frequently much of thorax red-brown, lateral angles of posterior propodaeal margin frequently with a spot of yellow. Sixth tergite black ***saegeri*** Arnold (p. 394)

4 Forewing with apical infuscation occupying outer half or marginal cell, most of SMC3 and part of second discoidal cell. Pronotum often margined posteriorly with yellow: occasionally with other yellow maculae on thorax ***bifasciatus*** Tullgren (p. 400)

– Apical infuscation limited to area beyond closed cells. Without yellow margin to pronotum . . . . ***nigripes*** Haupt (p. 396)

Males

1 Head broader than high (TFD exceeds FD). Antennae distinctly crenulate. Genitalia with basal hooklets substantially reduced. Oriental region. (***canifrons***-group) 2

– Head narrower (TFD approximately=FD). Antennae only slightly crenulate. Genitalia with basal hooklets normal, single. Ethiopian region. (***morosus***-group) 3

2 Femora and tibiae 2 and 3 black, often with a yellow macula dorsally on tibia 3. Tergites all black, all grey, or each is black anteriorly and grey posteriorly. Genitalia (Text-figs 2, 3) . . . . ***canifrons*** Smith (p. 382)

– Part of femora and tibiae light red-brown. Anterior tergites entirely grey, posterior tergites entirely black. Genitalia (Text-figs 6, 7) . . . ***rufipes*** sp. n. (p. 387)

3 Body colour black with more or less extensive yellow maculae; at least some spots of yellow on mesopleura and metapleura and centrally on propodaeum. Wings fusco-hyaline with a tinge of yellow, infuscation more definite apically. Genitalia (Text-figs 26, 27) . . . . ***bifasciatus*** Tullgren (p. 400)

– Body colour black with varying amounts of red-brown; often with some yellow maculae, but if so never on meso- or metapleurae or centrally on propodaeum. Wings yellow with more or less apical infuscation 4

4 Apical infuscation ill-defined, merging gradually with yellow region. Usually with lateral spots of yellow on propodaeal flanges, and often with yellow maculae on some tergites. Genitalia (Text-figs 22, 23). Madagascar . . ***saegeri*** Arnold (p. 394)

– Apical infuscation well defined, covering SMC3 and most of marginal cell. Devoid of yellow maculae on mesothorax, metathorax, propodaeum or abdomen. African species 5

5 SMC3 much narrowed above, much shorter on radial vein than is SMC2. Mesonotum red-brown, with a single median anterior black streak. Genitalia (Text-figs 20, 21) **morosus** Smith (p. 388)

– SMC3 less narrowed above, frequently as long on radial vein as is SMC2. Mesonotum entirely black. Genitalia (Text-figs 24, 25) . . . . **nigripes** Haupt (p. 396)

THE *CANIFRONS*-GROUP

♀. Dark brown or black with more or less grey pubescence; wings substantially fuscous with more or less violaceous reflections.

♂. Head wider than high, antennae markedly crenulate, genitalia with basal hooklets much reduced.

Oriental region.

Anoplius (Orientanoplius) canifrons (Smith) **comb. n.**

(Text-figs 1–4, 9)

Pompilus canifrons Smith, 1855 : 146. Holotype ♀, SUMATRA (BMNH) [examined].

Pompilus leucopheus Smith, 1857 : 92. Holotype ♂, WEST MALAYSIA (UM) [examined]. **Syn. n.**

Pompilus limbatus Smith, 1861 : 78. Holotype ♂, SULAWESI (UM) [examined]. **Syn. n.**

Pompilus nigrocaeruleus Smith, 1861 : 79. LECTOTYPE ♀, SULAWESI (UM), here designated [examined]. **Syn. n.**

Pompilus ignobilis Saussure, 1867 : 60. LECTOTYPE ♀, CEYLON (MHN), here designated [examined]. **Syn. n.**

Pompilus rufounguiculatus Taschenberg, 1869 : 54. Holotype ♀, JAVA (ZM) [examined]. **Syn. n.**

Pompilus atropos Smith, 1879 : 146. Holotype ♀, SUMATRA (BMNH) [examined]. **Syn. n.**

Salius canifrons (Smith); Dalla Torre, 1897 : 216 (new combination, erroneously attributed to Kohl, 1884 : 45).

Psammochares pluto Turner, 1917 : 69. LECTOTYPE ♀, AUSTRALIA (BMNH), here designated [examined]. **Syn. n.**

Sericopompilus canifrons (Smith); Banks, 1934 : 97; ♂.

Sericopompilus canifrons (Smith); Banks, 1938 : 248; ♀, ♂.

LECTOTYPE DESIGNATIONS.

(1) *Pompilus nigrocaeruleus* Smith. The description states 'length 9–10 lines', indicating that Smith described from more than one specimen. Two females in the Hope department (UM) bear circular locality labels ('Mak') and blue labels in Smith's handwriting, 'Pompilus nigro-coeruleus Smith'. I have labelled, and here designate as lectotype, the smaller specimen, which is in slightly better condition.

(2) *Pompilus ignobilis* Saussure. Described from four females collected by Humbert in Ceylon. Two female specimens in the main collections of the MHN, Geneva, bear labels in Saussure's handwriting, 'Pompilus ignobilis Sss'. The first bears a printed locality label 'Trincom. Ceylan', of the type normal for material collected by Humbert in Ceylon. The second specimen bears no such printed locality label, but a printed label 'Cn. de Saussure', on which 'Trincomalie' has been handwritten. This specimen also bears two other labels, one bearing the figures

'171' in ink, and the second 'Pompilus ignobilis Sauss ♀' in handwriting other than Saussure's. A third specimen from a box of miscellaneous Pompilidae bears a single printed label, 'Trincom. Ceylan', identical with that of the first specimen. The three are conspecific, and agree well with the description. Although none bear type-labels, I am satisfied that these are three syntypes of *P. ignobilis* Saussure; the putative fourth syntype has not been traced and may be presumed lost. The first specimen here recorded has been labelled and is here designated as lectotype.

(3) *Psammochares pluto* Turner. Described from a single female and a single male, both in the collections of the BMNH. I have labelled, and here designate as lectotype, the female specimen.

♀. Length 12–21 mm. Dark violet-brown or black. Fore wing infuscate with violaceous reflections, wingtip often slightly darker. Hind wing with more or less hyaline area basally. Pubescence variable, most commonly extensive grey pubescence on face and clypeus, anterior and posterior parts of pronotum, most of thorax save mesonotum and dorsum of scutellum, anterior half of tergites, and variously on coxae and legs. Otherwise dark brown or black. The extent of grey pubescence may be reduced or totally absent. Face with a small yellow-orange spot against inner orbit, sometimes absent, most frequently in dark-pubescent forms. Pubescence reflecting silvery on lower face and coxae, sometimes markedly so.

Apical margin of clypeus feebly to markedly concave. Inner orbits converging above, subparallel or diverging below. Front narrow, MID less than 0·5 × TFD. POL exceeding OOL, variable. Posterior pronotal margin distinctly angulate. Propodaeum with a flattened declivity, not rounded laterally but more or less angular. Fore basitarsus with three comb-spines, 1·0–1·5 × as long as median thickness of segments bearing them. SMC3 narrowed above, much shorter on radial vein than SMC2. Third transverse cubital vein slightly arched towards wingtip or sometimes virtually straight.

♂. Length 8·0–14·5 mm. Coloration similar to female, but yellow on face varies from a thin strip bordering inner orbits to substantial areas of yellow extending onto clypeus and mandible, and bordering outer orbits, also hind margin of pronotum and ventral surface of scape, and dorsal surface of hind tibia. Proximal antennal segments often red-brown ventrally. Wings fuscous as in female, but fore wing frequently with hyaline areas basally also. Pubescence as in females, but grey-pubescent form with more substantial area of tergites so coloured. Silvery pubescence as females, often quite extensive.

Eyes converging above, subparallel or converging below, UID less than LID (Text-fig. 1). Antennae distinctly crenulate distally. Propodaeum weakly arched longitudinally, broad and flat transversely with an abruptly rounded lateral dorsal margin. SGP arched transversely (Text-fig. 3), genitalia (Text-fig. 2).

A. canifrons females are not readily separable from those of the closely related *A. rufipes* sp. n., described below. Males, however, are easily distinguished both on the basis of coloration and the form of the genitalia (see further discussion under *A. rufipes*).

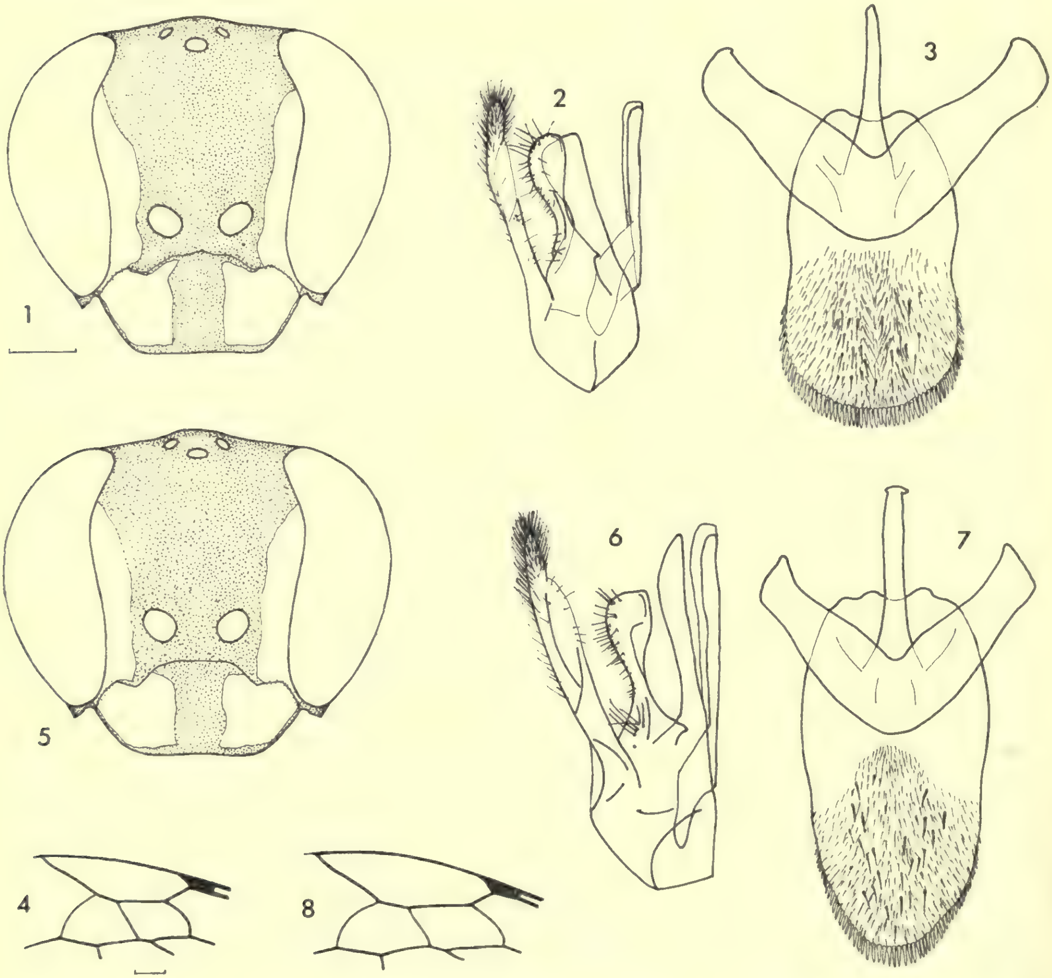
DISTRIBUTION. Widely distributed through forest areas of the Oriental region and Indonesia, extending into Queensland, Australia (map, Text-fig. 9).

VARIATION. Populations in southern India, Ceylon and Queensland are more usually dark-pubescent, although considerable variation may be noted between individuals within any one population in this respect. One female specimen from Queensland (lectotype of *P. pluto* Turner) has particularly divergent lower orbits and a relatively wide clypeus. The shape of SMC2 and SMC3 is also distinct from that of other populations; however, the male genitalia accord well with those of other populations examined. There seem to be no good grounds for separating this peripheral population.

Biology. A female from southern India, Nilgiri Hills, 3500′, collected by P. S. Nathan during April 1949, is pinned with its spider prey, an adult female *Ctenus* sp. (Ctenidae).

Material examined.

Pompilus canifrons Smith, holotype ♀, Sumatra (*Sir Stamford Raffles*) (BMNH).



Figs 1–8. 1–4. *A. canifrons:* 1. ♂ head, viewed from front. 2. ♂ genitalia, left half, ventral view. 3. ♂ SGP. 4. ♀ SMC2 and SMC3 of forewing. 5–8. *A. rufipes:* 5. ♂ head, viewed from front. 6. ♂ genitalia, left half, ventral view. 7. ♂ SGP. 8. ♀ SMC2 and SMC3 of forewing. Scale: 1, scale line=0·5 mm; 2, 3, 5–7, same scale; 4, scale line=0·5 mm; 8, same scale.

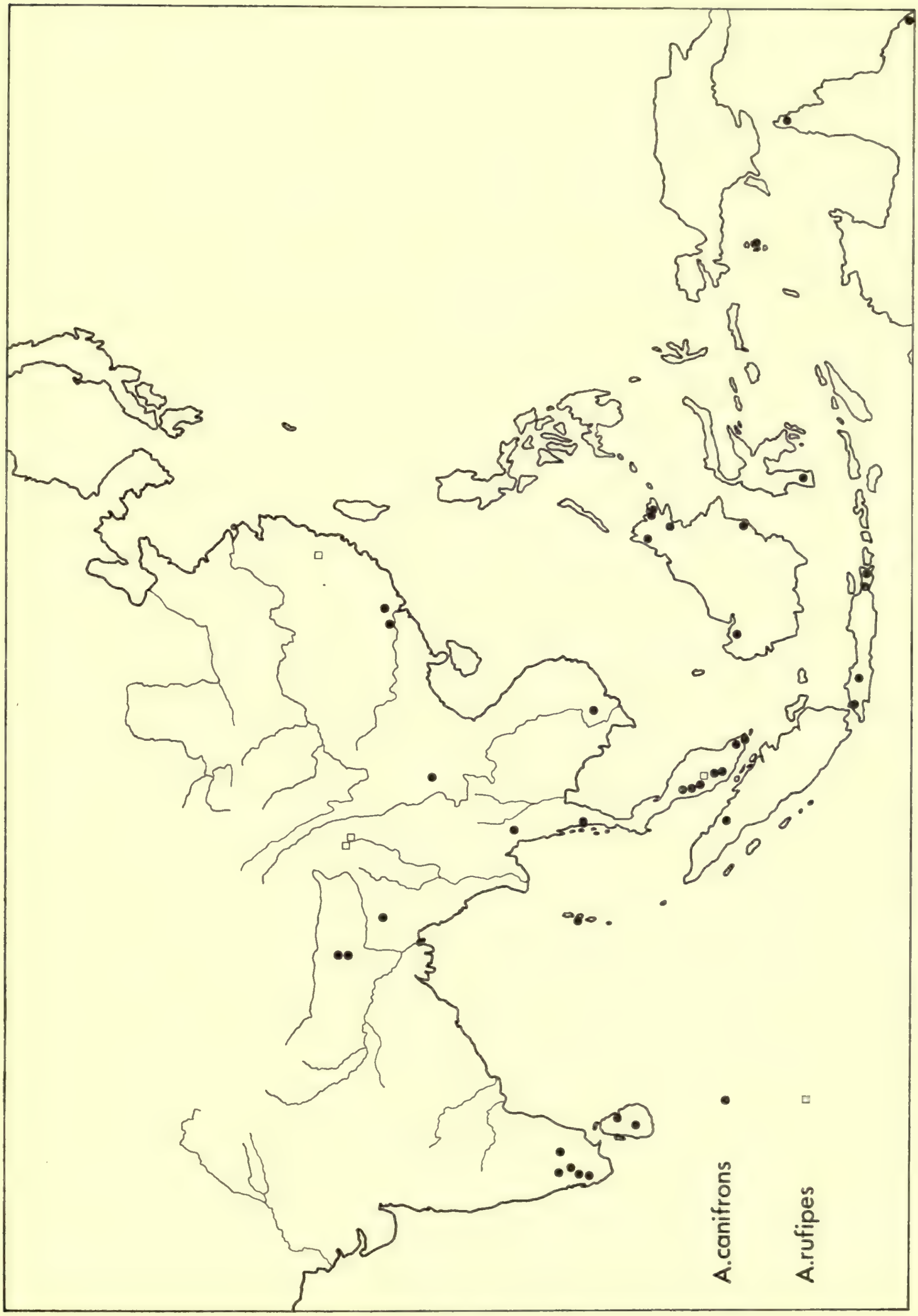

A.canifrons ●
A.rufipes □

FIG. 9. Map showing the known distribution of *A. canifrons* and *A. rufipes.*

Pompilus leucopheus Smith, holotype ♂, West Malaysia (UM). *Pompilus limbatus* Smith, holotype ♂, Sulawesi (*A. R. Wallace*) (UM). *Pompilus nigrocaeruleus* Smith, lectotype ♀, Sulawesi (*A. R. Wallace*) (UM). *Pompilus ignobilis* Saussure, lectotype ♀, Ceylon: Trincomalee (*Humbert*) (MHN). *Pompilus rufounguiculatus* Taschenberg, holotype ♀, Java (ZM). *Pompilus atropos* Smith, holotype ♀, Sumatra (*Sir Stamford Raffles*) (BMNH). *Psammochares pluto* Turner, lectotype ♀, Australia: Queensland, Mackay, iii.1897 (*R. E. Turner*) (BMNH).

Andaman Islands: 1877?, 1 ♀, 1 ♂ (BMNH). Aru: Aru Islands (no further data), 1 ♀ (ANIC). Australia: Queensland, Mackay, ii.1899, 1 ♂ (*R. E. Turner*) (paralectotype of *P. pluto*); North Queensland, Cape York Peninsula, Iron Range, 26–31.v.1971, 1 ♀; 1–9.vi.1971, 1 ♀; 27.iv–4.v.1973, 2 ♀, 2 ♂ (*S. R. Monteith*) (ANIC); Queensland, no further data, 1 ♂ (BMNH). Borneo: 'Sabah', Bukit Kretam, 1952, 1 ♂ (*J. D. Hedley*); Mt Matang, 5.xii.1913, 1 ♀ (*G. E. Bryant*); Kalabakan, 3–11.iv.1973, 2 ♀, 2 ♂; Ulu Dusun, 12–22.v.1973, 1 ♂; Kinabalu National Park, Poring Springs, 1600′, 6–10.v.1973, 1 ♂ (*K. M. Guichard*) (BMNH); Samarinda, iv.1937, 1 ♀, 1 ♂ (*M. S. Walsh*) (MCZ). Burma: Mergui, 12.v.1890, 1 ♀; Tenasserim, Thaungyin Valley, iii.1890, 1 ♂; xii.1892, 1 ♀; v.1893, 1 ♀; ii.1894, 1 ♀; ix.1894, 1 ♀; Haundraw Valley, viii.1894, 1 ♀; ix.1894, 1 ♀, 1 ♂ (*C. T. Bingham*) (BMNH). Ceylon: Trincomalee, 2 ♀ (*H. Humbert*) (paralectotypes of *P. ignobilis*); Kandy, 1932, 1 ♀ (*Lavavoire*) (MHN); Kandy, ii.1903, 1 ♂ (*R. E. Turner*); iii.1910, 1 ♀ (*E. Comber*); iii.1917, 1 ♀, 1 ♂; vi.1918, 2 ♂ (*O. S. Wickwar*) (BMNH); Kandy, vi.1953–ii.1954, 5 ♀, 8 ♂ (*F. Kaiser*) (coll. Wahis); Kandy, Udawattekelle, 27.x.1966, 1 ♀; 16.xi.1966, 1 ♀ (*J. F. G. & T. M. Clarke*) (USNM); Kandy, 25.xi.1929, 1 ♀ (*E. Enslin*) (ZM, Halle). China: 'Howlik', 1 ♀ (*R. C. L. Perkins*) (BMNH); East Kwantung, 'Yim Na San', 11.vi.1936, 1 ♀ (*L. Gressott*) (MCZ). India: Coimbatore, Valharai, 6.x.–2.xi., 5 ♀; Nilgiri Hills, Gudalur, iv.1949, 3 ♀ (one with prey); Cherangode, v.1950, 3 ♀ (*P. S. Nathan*) (MCZ); Nilgiri Hills, Kallar, xi.1963, 1 ♂ (*P. S. Nathan*); Anamalai Hills, Chinchona, v.1962, 3 ♀; v.1969, 1 ♂ (coll. Wahis); Shevaroy Hills, Salem, 6.ix.1934, 1 ♂; Siruvani, 5.vi.1937, 1 ♂ (*P. S. Nathan*) (BMNH); Coimbatore, Muthikolam, ix–x.1938, 1 ♀, 3 ♂; Travancore, Tenmalai, x.1938, 1 ♂; Burliyar, Coonoor Ghaut, 17.iv.1937, 1 ♂ (*BMNH Expedn to S. India*) (BMNH); Bangalore, 28.v.1920, 1 ♀ (*T. R. Bell*); Assam, Shillong, ix–x.1903, 2 ♀ (*R. E. Turner*); Sikkim- 'N. Sikkim', iv.1894, 2 ♀; v.1894, 1 ♀; ix.1894, 1 ♀; Tukvar, 4000′, iv.1894, 4 ♀, 1 ♂; Runjit Valley, iv.1894, 8 ♀, 2 ♂; Darjeeling, iii.1894, 1 ♂ (*C. T. Bingham*) (BMNH). Java: Buitenberg, 2 ♀, 1 ♂ (ex R. C. L. Perkins coll.) (BMNH); West Java, Mt Djampang, Tjigaeha, i–ii.1938, 2 ♀, 1 ♂; Salatri, i.1938, 1 ♀; Mt Tjioeng, viii.1937, 1 ♂; Gunung Malang, 3–4000′, x.1937, 1 ♀; i.1938, 1 ♂; Gunung Gedeh, above 3000′, ix.1937, 1 ♂; East Java, Tengger Highlands, 4000′, v.1938, 6 ♀, 4 ♂ (*K. M. Walsh*) (BMNH); Soeka Boemi, 1 ♀, 1 ♂ (IRSNB); Idjen Plateau, Blawan, 26.vi.1939, 1 ♀, 1 ♂ (*J. v. d. Vecht*) (NMSR); Blawan, 26.vi.1939, 1 ♀, 1 ♂; Kalisengon, 28.vi.1939, 1 ♀; Mt Gedeh, Tapos, 1–16.viii.1936, 1 ♂ (*J. v. d. Vecht*) (MCZ); Tjzngsana, 1936, 1 ♀; Bileidjilan, i.1937, 1 ♂ (*M. S. Walsh*) (MCZ). Laos: 1918, 1 ♀ (*R. V. de Salvaza*) (BMNH). Singapore: 13 ♀, 22 ♂ (*C. F. Baker*) (USNM, MCZ); 1 ♀ (*H. N. Ridley*); Botanic Gardens, 25.vi.1926, 1 ♂ (*C. B. Kloss*) (BMNH). South Vietnam: Tay Ninh, 11.xi.1924, 1 ♀, 1 ♂ (*R. V. Salvaza*) (IRSNB). Sumatra: Pematang Siantar, 16.viii.1930, 1 ♀; 24.iv.1931, 1 ♀; 19.ii.1932, 1 ♀ (*R. I. Nel*) (BMNH). SULAWESI: 1 ♀ (*A. R. Wallace*) (paralectotype of *P. nigrocaeruleus*) (UM); near? Makassar, 1 ♂ (*A. R. Wallace*) (BMNH). WEST MALAYSIA: Kedah, iii–iv.1928, 3 ♂; Penang Hills, 27.v.1955, 1 ♂; 8.ii.1959, 1 ♀; 6.ii.1961, 1 ♀; 3.xii.1964, 1 ♀; 2.viii.1966, 1 ♂; Gombok, 20–26.vi 1928, 1 ♀, 2 ♂ (*H. T. Pagden*); Selangor, 27.i.1933, 1 ♂; Bukit Kutu, 3300′, 1 ♂ (*A. R. Sanderson*); Sungei Pomsom, 2.ix.1928, 1 ♂; Kuala Pomsom, 29.iii.1929, 1 ♀ (*H. T. Pagden*); Batu Caves, 21.vi.1928, 1 ♂ (*Miller*); Perak, 23.iv. 1961, 1 ♀ (*H. T. Pagden*); Johore, Lombong, 19.xi.1967, 1 ♀, 2 ♂ (*C. G. Roche*) (BMNH).

Anoplius (Orientanoplius) rufipes sp. n.

(Text-figs 5–8, 9)

♀. Length 14–17 mm. Falls within the range of morphological and colour variation exhibited by *A. canifrons* Smith (p. 383).

♂. Length 11–16 mm. Dark brown to black. Yellow coloration margins inner orbits, extends over most of clypeus save a median dark area, marginal streak adjacent to orbit on temples, ventral surface of scape and posterior margin of pronotum. Some yellow-orange ventrally on fore and mid coxae, and outer surface of fore tibia and tarsus. Distal part of mid femur, most of hind femur, mid and hind tibiae, and mid tarsi, reddish orange. Face, and thorax laterally, ventrally, and on propodaeum extensively silvery-pubescent, also coxae and femora. Tergites one to three wholly grey pubescent, tergites four to seven black pubescent. Morphologically very similar to *A. canifrons* Smith (p. 383). SGP strongly folded transversely (Text-fig. 7), genitalia (Text-fig. 6).

I am unable to discover any consistent characters by which to separate *A. canifrons* females from the females I associate on the basis of spatial and temporal coincidence with the males described above. The West Malaysian populations of the two species exhibit a noticeable difference in the relative proportions of SMC2 and SMC3 (Text-figs 4, 8); this character is, to a more limited extent, apparent also in the males. However, regional variation produces a marked intergradation in this and other characters in the Burmese populations, the females of which I have identified purely on a basis of coincidence with their males.

The males are readily separated by coloration and the form of the genitalia. However, the range of morphological variation reflects the situation described above for the females; although minor differences may be discerned for geographically close populations of the two species, no wholly reliable morphological differences hold good for the entire geographical range. For example, the relative proportions of the face give reliable identification in West Malaysia (Text-figs 1, 5). However, in most other parts of its range, *A. canifrons* males approximate much more closely to *A. rufipes* (Text-fig. 5) than to their own West Malaysian populations.

DISTRIBUTION. At present known only from highland Burma, West Malaysia and southern China (map, Text-fig. 9).

VARIATION. A single male from Nan Ping is considerably larger than the other male paratypes, all of which fall between 11 and 13 mm in length.

One female (Burma, 12.xi.1938) has a teratological malformation of the right-hand side of the head capsule. One male (Burma, 29.vii.1938) has a malformation of the right antenna.

MATERIAL EXAMINED.

Holotype ♂, BURMA: Nam Tamai Valley, E. 97°48′, N. 27°48′, 3500′, 12.ix.1938 (*R. Kaulback*) (BMNH).

Paratypes. BURMA: Nam Tamai Valley, E. 97°48′, N. 27°48′, 3500′, 12.ix.1938, 2 ♀, 2 ♂; 16.ix.1938, 2 ♂; E. 97°54′, N. 27°42′, 3000′, vii–viii.1938, 6 ♀, 2 ♂; 4000′, 1 ♀ (*R. Kaulback*) (BMNH). CHINA: Nan Ping? ('Yen-ping'), 9.vii.1917, 1 ♀; 6.viii.1917, 1 ♂; 10.viii.1917, 1 ♀ (coll. Wahis). WEST MALAYSIA: Pahang, Cameron Highlands, Ginting Kial, 5200′, 18.vii.1938, 5 ♀, 1 ♂ (ex coll. Federated Malay States Museum) (BMNH).

Non-paratypic material. WEST MALAYSIA: Pahang, Cameron Highlands, 4800′, 6.vi.1935, 1 ♀; 5000′, 20.vi.1938, 1 ♀; Selangor, Bukit Kutu, iv.1915, 1 ♀ (ex coll Fed. Malay States Mus.) (BMNH); Selangor, 3.ii.1930, 1 ♀ (*H. T. Pagden*) (BMNH).

THE *MOROSUS*-GROUP

♀. Dark brown or black with more or less red-brown coloration; wings substantially yellow·

♂. Head as broad as high, antennae only slightly crenulate, genitalia with basal hooklets present, single.

Ethiopian region.

Anoplius (Orientanoplius) morosus (Smith)

(Text-figs 10, 13, 16, 19–21)

Pompilus morosus Smith, 1855 : 140. LECTOTYPE ♀, SOUTH AFRICA (BMNH), here designated [examined].

Pompilus elongatus Ritsema, 1874 : 188. Holotype ♂, ZAIRE? ("Neder-Guinea") (RNH) [examined]. [Junior secondary homonym in *Pompilus* of *Anoplius elongatus* Lepeletier, 1845.] **Syn. n.**

Pompilus ritsemae Dalla Torre, 1897 : 316. [Replacement name for *Pompilus elongatus* Ritsema, 1874.] **Syn. n.**

Anoplius morosus (Smith); Arnold, 1937 : 64; ♀, ♂.

Africanoplius aciculatus Haupt, 1950 : 43. LECTOTYPE ♂, RHODESIA (NMSR), here designated [examined].

Africanoplius decoratus Haupt, 1950 : 44. LECTOTYPE ♂, TANZANIA (MNHU), here designated [examined].

Africanoplius morosus (Smith); Haupt, 1950 : 46; ♀.

Africanoplius analis Haupt, 1950 : 46. Holotype ♀, MOZAMBIQUE (ZMH) [examined]. **Syn. n.**

[*Africanoplius apicalis* (Haupt) sensu Haupt, 1950 : 45; ♂. Misidentification.]

LECTOTYPE DESIGNATIONS.

(1) *Pompilus morosus* Smith. The supposed holotype female in the collections of the BMNH bears a circular red-edged 'holotype' label and a label in Smith's handwriting, 'morosus type Sm'. However, the locality ('Angola') and the date of accession ('1873') borne by this specimen indicate that there has been a substitution of specimens subsequent to publication of the original description. One female in the collections bears data compatible with that published in the description, viz. 'Port Natal', and with an accessions date ('1849') prior to the date of description. This specimen has been labelled and is here designated lectotype.

(2) *Africanoplius aciculatus* Haupt. Haupt proposed *A. aciculatus* as a new name for males which he had not seen but which he believed Arnold (1937) had incorrectly identified as *A. morosus*. The number of possible syntypes is uncertain, since Arnold did not label or date all specimens seen and determined by himself. However, I have labelled, and here designate as lectotype, a male specimen of *A. morosus* which was collected by Arnold in person, and which was certainly before him when he described the male of *A. morosus;* the specimen is deposited in the Rhodesian Museum, Bulawayo.

(3) *Africanoplius decoratus* Haupt. Haupt states in a footnote to the key couplet in which he described *A. decoratus* that the syntypes ('Typen') are part of the material from 'Nyassa-see' determined as *A. morosus* in the collections of the MNHU. In the same key, he states that the male of *A. morosus* is unknown. I have seen two female and seven male specimens from Berlin, all of which bear the same data. Firstly, a blue card locality label 'Nyassa-see', with various dates. One female and one male specimen bear labels with the complete binomen 'Pompilus morosus Sm.', the remainder simply 'morosus'. Of the seven males (all *A. morosus*), I have labelled and here designate as lectotype the specimen that corresponds most closely with the figure given by Haupt (1950 : 44), which is, however, erroneous in some respect for all the specimens; this is attributable to poorly angled incident lighting during drawing.

♀. Length 10–22 mm. Black; head, prothorax, mesoscutum (save a narrow anterior median black streak), scutellum, metanotum, sixth tergite, apical part of femora, tibiae and tarsi, light or dark red-brown. Antennae orange or light red-brown. Wings yellow, with an apical infuscation (Text-fig. 10) which just invades the tip of the marginal cell. Face beside and beneath antennal insertion sometimes with silvery pubescence, elsewhere brownish black or black.

Apical margin of clypeus feebly to markedly concave, inner orbits converging above, converging below in smaller specimens, normally subparallel or slightly diverging in large examples. MID varying from 0·50 to 0·57 × TFD. POL and OOL subequal. Posterior pronotal margin nearly always distinctly angulate (Text-fig. 13). Propodaeum as broad as long, evenly rounded, sometimes with slight flattening on the declivity. Fore basitarsus with three comb-spines, often twice as long as median thickness of segment bearing them. Larger individuals have an additional short or normal length spine. SMC3 narrowed above, normally much shorter on radial vein than is SMC2.

♂. Length 9·0–14·5 mm. Coloration similar to female, except red-brown areas lighter, almost yellowish in some individuals, particularly adjacent to orbit and temple. Posterior pronotal margin with yellow transverse band. Fore femora more extensively red-brown, mid and hind tarsi dark brown. Ocellar area black, often two small black areas on front above antennal insertion. These areas extend and may become confluent in small specimens. Mesonotum red-brown with narrow anterior black streak. Apical infuscation of fore wing invades SMC3, most of marginal cell, part of SMC2 and third discoidal cell. Apical tip and hind margin of hind wing also infuscate. Pubescence as in female, but often with some silvery pubescence on fore coxae, also on mesosternum and part of mid coxae.

SMC3 of fore wing narrowed above, distinctly shorter on radial vein than SMC2. Area of SMC3 approximately equal to that of SMC2. SGP (Text-fig. 20) weakly arched transversely, normally arcuate at tip, but occasionally truncate. Genitalia (Text-fig. 21).

Although previously confused with females of *A. nigripes* (p. 396), *A. morosus* females are readily separated on the basis of the characters given in the key to species. Arnold (1937) recognized the male, but Haupt (1950) failed to do so; Arnold (1952; 1955) placed *A. aciculatus* and *A. decoratus* in the synonymy of *A. morosus*.

Anoplius morosus var. *umtaliensis* de Saeger, 1945 : 114. This *nomen nudum* had two female specimens cited as examples. I have seen these specimens; they are females of *Anoplius* (*Anoplius*) *aethiopicus* Arnold, 1937.

DISTRIBUTION. Widely distributed through woodland and savanna areas of tropical Africa from Senegal to South Africa (map, Text-fig. 19).

VARIATION. This species exhibits very little colour variation, in contrast to its two mainland African congeners and its very near relative in the Madagascan fauna. Most morphological variation appears to correlate with absolute size. However, two females from Sao Thomé Island exhibit morphological and colour differences srom the mainland populations. There is a development of red-brown coloration on the fore and mid coxae and the mesopleuron, and the fore wing has a larger area of apical infuscation, approaching the normal pattern of the males. SMC3 is longer on the radial vein than is SMC2, as in *A. nigripes* (Text-fig. 11); otherwise, the Sao Thomé population has the characters of *A. morosus*. Males are not yet known from this population, which is very distinctive.

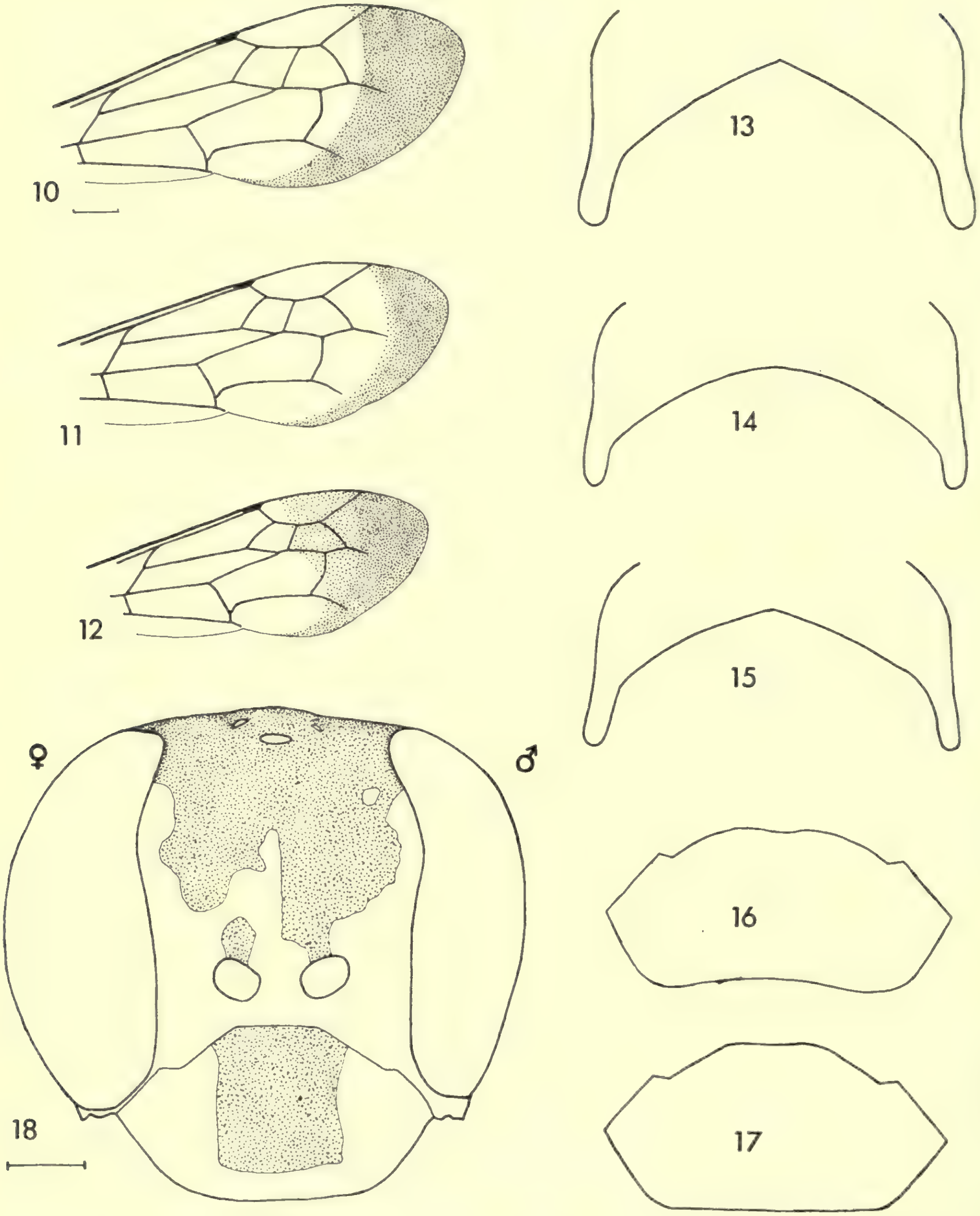
BIOLOGY. C. F. Huggins took a female of *A. morosus* in a cleared area adjacent to part of the Kakamega Forest, western Kenya, on 20 January, 1972, together with an adult female Lycosid spider of the genus *Pardosa*. The paralysed prey was being dragged across the ground by the spider-wasp, which was walking backwards. No more detailed observations were made. I have seen females of this species at Nova Lisboa in Angola, searching actively amongst ground vegetation in *Brachystegia* woodland, and entering crevices in the ground, particularly some exposed by the uprooting of a fallen tree. A female was also observed searching on the vertical surface wall of a man-made trench in Nova Lisboa. Both sexes have been taken at flowers drenched by the spray of the cataract at Victoria Falls, in conditions which simulated heavy rainfall, except that the sun was shining brightly.

MATERIAL EXAMINED.

Pompilus morosus Smith, lectotype ♀, SOUTH AFRICA: Durban ('Port Natal'), 'Purchased of Stevens, 1849. Probably collected by Gueinzius.', no further data (BMNH). *Pompilus elongatus* Ritsema, holotype ♂, ZAIRE? ('Neder-Guinea'): 'Congo, Piaget' (RNH). *Africanoplius aciculatus* Haupt, lectotype ♂, RHODESIA: Hope Fountain, 5.ii.1922 (*G. Arnold*) (NMSR). *Africanoplius decoratus* Haupt, lectotype ♂, TANZANIA: Langenberg, iii.–iv.1898 (*Fulleborn*) (MNHU). *Africanoplius analis* Haupt, holotype ♀, MOZAMBIQUE: Rikatla (*Junod*) (ZMH).

ANGOLA: 'Angola' (*J. J. Monteiro*), no further data, 1 ♀ (supposed type of *P. morosus*); Rocadas, west bank of R. Cunene, in Malaise trap, 21.ii.1972, 2 ♂; near Mt Moko, 12 miles S.W. of Luimbale, 5500′, on flowers of Compositae by stream, 21.iii.1972, 2 ♂; Nova Lisboa, Chienga, in *Brachystegia* woodland, 23.iii.1972, 2 ♀ (*BMNH Southern African Expedn* 1972) (BMNH); Dundo, xi.1948, 1 ♀ (*A. de*

Barros Machado) (MRAC). Congo (Brazzaville)?: 'Congo', 1896? 1 ♀, 3 ♂ (*Dybowski*) (MNHN). Ethiopia: Higo Samula, 30.x.1911, 1 ♂ (*R. J. Stordy*); Harrar, 1912, 1 ♀ (*G. Kristensen*); Akaki, 8.ii.1948, 1 ♀, 1 ♂; Asba Tafari, 7800′, 2.ix.1945, 1 ♂ (*K. M. Guichard*) (BMNH); Bahar Dar, 4.vii.1965, 1 ♂ (*A. E. Gurney*) (USNM). Gabon: Libreville, 1898, 1 ♀ (*Chalot*) (MNHN). Gambia?: 'Gambia', no further data, 2 ♂ (ex F. Smith coll.) (BMNH). Kenya: Ukumbangi, Nzoi, i–ii.1889, 1 ♀, 1 ♂; Rabai, viii.1930, 1 ♀, 2 ♂ (*van Someren*); Nairobi, vi.1912, 1 ♂ (*A. D. Milne*); Naivasha, ix.1939, 1 ♂; iv.1940, 1 ♂ (*H. J. A. Turner*); 30 miles from Magadi Junction, iv.1912, 1 ♂ (*F. G. Hamilton*); Kibwezi, viii.1932, 1 ♂ (*McArthur*); Kwali Forest, 20 miles W. of Mombasa, 1.vi.1948, 1 ♀ (*M. Steele*); Kakamega Forest, 34°53′ E., 0°14′ N., 20.i.1972, 1 ♀ with prey (*C. F. Huggins*) (BMNH); Tiwi, ix.1911, 1 ♂ (*Allaud & Jeannel*); Nyeri, 8.v.1922, 2 ♂ (*A. Seyrig*) (MNHN); Tama River, 1892 (*Chanler Expedn*) (USNM). Malawi: Mlange, xii.1912–ii.1914, 40 ♀, 35 ♂; Shire Valley, 1.viii.1913, 2 ♂; between Fort Mangoche and Chikala Boma, iii.1910, 1 ♀; S.W. of Lake Chilwa, 16.i.1914, 1 ♀; 'S.W. shore of Lake Nyasa', ii.1910, 1 ♂ (*S. A. Neave*) (BMNH). Mozambique: Kola Valley, east of Mt Chiperone, 1700′, 21.xi. 1913, 7 ♀, 11 ♂ (*S. A. Neave*); Beira, 12.x.1939, 1 ♂; (BMNH); Delagoa, Rikatla. 1 ♂ (*Junod*) (so-called 'allotype' of *A. apicalis* Haupt) (ZMH); Salone, 25.x.1957, 1 ♂ (NMSR); Lourenço Marques, i.1909, 1 ♀ (*Junod*); Pungwe Bay (=Beira?), viii.1903, 1 ♂ (*P. Krantz*) (TM); Chimoia, 1928, 1 ♂ (*P. Lesne*) (MNHN). Nigeria: Ibadan, 4.vii.1947, 2 ♀; 20.vii.1951, 1 ♀ (*J. T. Davey*); Zaria, Samaru, 29.iv.1972, 1 ♀ (*J. C. Deeming*); Umudike, 12.iv.1951, 1 ♂ (*J. L. Gregory*) (BMNH). Rhodesia: Salisbury, ii–iv.1900, 2 ♀, 1 ♂ (*G. A. K. Marshall*) (BMNH); 1 ♀, same data (NMSR); Victoria Falls, 30.iv.1972, 2 ♀, 1 ♂ (*M. C. Day*) (BMNH); Bulawayo, 30.xi.1919, 1 ♀ (*G. Arnold*) Matetsi, 23.x.1934, 1 ♀ (*R. H. R. Stevenson*); Matopos, 18.xi.1923, 1 ♂ (NMSR). Rwanda: 1952, 1 ♀ (*R. Laurent*) (MRAC). Sao Thomé Island: 5.xi.1932, 1 ♀ (*W. H. T. Tams*) (BMNH); 1920, 1 ♀ (*H. Havel*) (MNHN). Senegal: Dakar, 1905, 1 ♀, 1 ♂ (*G. Melon*) (MNHN). Sierra Leone: Njala, i.1936, 1 ♀ (*E. Hargreaves*); Manawa, 12.viii.1912, 1 ♂ (*J. J. Simpson*); no further data, 1 ♂ (BMNH). South Africa: Port St. John, v.1923, 1 ♂; iv.1924, 1 ♀; Natal, Kloof, ix.1926, 1 ♂ (*R. E. Turner*) (BMNH); Natal, Umhlahanga Rocks, v.1955, 1 ♂; Zululand, Mfongosi, xii.1916, 1 ♂ (*W. E. Jones*) (NMSR); Transvaal, 8 miles W. of Barberton, 13.ii.1968, 2 ♀; Natal, Lake Sibayi, 13–25.iii.1968, 1 ♂ (*D. J. Brothers*) (AM); Camperdown, 4.iv.1908, 1 ♂ (*G. F. Leigh*); Ramsgate, 7.v.1971, 1 ♀ (*L. Vári*) (TM); Durban, 15.iii.1915, 1 ♂ (*Bridwell*) (USNM). Sudan: 20 miles N. of Mongalla, on boat, 24.xii.1961, 1 ♂ (*J. L. Cloudsley-Thompson*) (BMNH). Tanzania: 'Nyassa-See', Langenberg, 1898–1899, 2 ♀; same data, 6 ♂ (paralectotypes of *A. decoratus*) (*Fulleborn*) (MNHU); Massassi, 15–23.vi.1936, 1 ♀, 1 ♂; 'Nyassa-See, Mbamba-bai', 12–16.iv.1936, 1 ♀; Matengo Hills, 1–10.i.1936, 1 ♀ (*Zerny*) (NM). Uganda: Entebbe, ii–vi.1913, 13 ♀, 4 ♂; Bweya, v.1913, 1 ♀, 4 ♂; Mwera, 31.vii.1913, 5 ♀, 1 ♂; Mabira Forest, vii.1913, 2 ♀, 1 ♂; Kampala, 17.iv.1913, 1 ♀; 6.i.1918, 2 ♂ (*C. C. Gowdey*); west shore of Lake Victoria, Buddu, 3700′, ix.1911, 8 ♀, 3 ♂; valley of Kafu river, xii.1911, 2 ♀; Entebbe, vii.1911, 1 ♀; Tero Forest, S.E. of Buddu, 3800′, ix.1911, 2 ♀, 1 ♂; near Kampala, 12.vii.1913, 1 ♀ (*S. A. Neave*); Tororo, Sukulu, 20.ix.1961, 1 ♀ (*E. Burtt*) (BMNH). Zaire: Banana, viii–ix.1915, 2 ♀



FIGS 10–18. 10–12. ♀ fore wing. 10. *A. morosus*. 11. *A. nigripes*. 12. *A. bifasciatus*. 13–15. Hind margin of ♀ pronotum. 13. *A. morosus*. 14. *A. nigripes*. 15. *A. bifasciatus*. 16, 17. ♀ clypeus. 16. *A. morosus*. 17. *A. nigripes*. 18. Gynandromorph individual of *A. bifasciatus*, head in front view. Scale: 10, scale line=1·0 mm; 12, 13, same scale; 18. scale line=0·5 mm; 13–17, same scale.

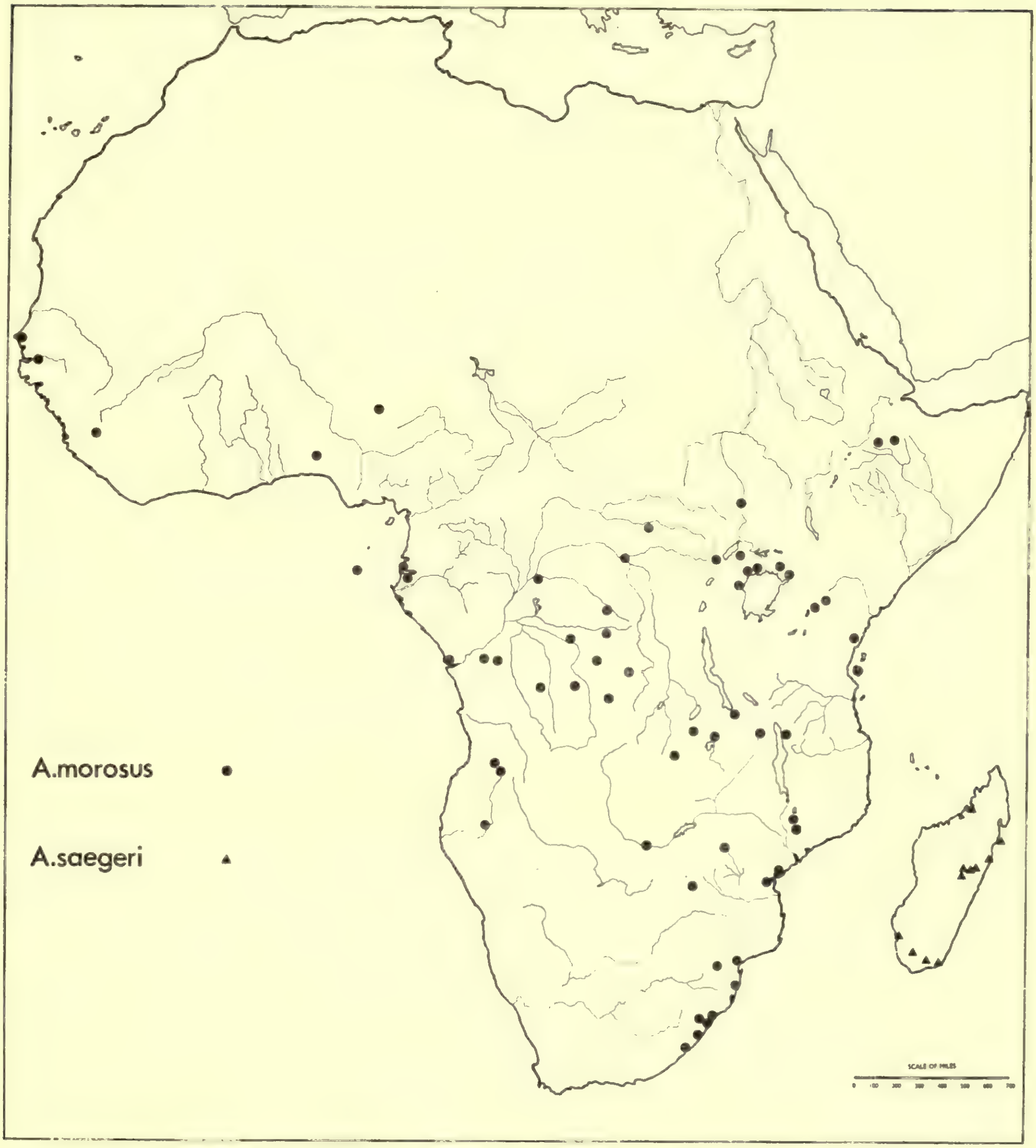

A.morosus ●
A.saegeri ▲
SCALE OF MILES
0 100 200 300 400 500 600 700

FIG. 19. Map showing the known distribution of *A. morosus* and *A. saegeri*.

(*Lang & Chapin*) (coll. Wahis); Eala, x–xi.1931, 1 ♀, 2 ♂ (*H. J. Bredo*); xii.1932, 1 ♀, 1 ♂; iv.1933, 1 ♀; v.1933, 1 ♂; iii.1935, 2 ♂ (*A. Corbisier*); xi.1936, 2 ♂ (*J. Ghesquière*); Bambesa, x–xii.1933, 3 ♀, 2 ♂ (*H. J. Bredo*); Kapanga, xii.1932, 1 ♀, 1 ♂; viii.1932, 1 ♀ (*F. G. Overlaet*); Luluabourg, 18.v.1919, 1 ♀ (*P. Callewaert*); 30.i.1963, 1 ♀ (*J. Deheegher*); Lubumbashi (Elizabethville), iv–v.1923, 1 ♀, 1 ♂ (*M. Bequart*); iii.1935, 1 ♀ (*C. Seydel*); Kibali-Ituri, 4.x.1931, 1 ♀ (*Mme. L. Lebrun*); Ituri, Bunia, 1938, 1 ♀ (*P. Lefevre*); Lemfu, i–ii.1945, 2 ♀, 1 ♂ (*P. de Beir*); Sankuru, 21.iv.1930, 1 ♀ (*J. Ghesquière*); Gandajika, 1954, 1 ♀ (*P. de Francquin*); Djeka, 1955, 1 ♀ (*R. Roisieux*); Kwango, Popokabalaka, ix.1949, 1 ♀ (*L. Dubois*); Kwango, Mwilambongo, ix.1949, 1 ♀ (*Van der Borght*); Katanga, Kasenga, iv.1931, 1 ♂ (*H. J. Bredo*); Kabinda, 1 ♀ (*Schwetz*); Basoko, iii.1949, 1 ♂ (*P. L. G. Benoit*); Lake Albert, Ishwa, ix.1935, 1 ♀ (*H. J. Bredo*); Lomami, Kaniama, 1931, 1 ♂; Congo da Lemba, 1.ii.1913, 1 ♂ (*R. Mayné*); Kasinga, 20.iii.1931, 1 ♀ (*H. J. Bredo*); Kayambo-Dikulwe, vi.1907, 1 ♂ (*S. A. Neave*) (MRAC); Thysville, 25.viii.1950, 1 ♂ (*M. Leclerq*); Kambaye, Lupula, 1930, 1 ♀ (*R. Colbert*) (IRSNB). ZAMBIA: Abercorn, 6.ii.1951, 1 ♀ (*R. Albrecht*); Upper Luangwa Valley, viii.1910, 1 ♀, 1 ♂ (*S. A. Neave*); N. of Lake Bangweulu, 11.xii.1946, 1 ♀ (BMNH); Abercorn, 22.xii.1943, 1 ♀ (IRSNB). ZANZIBAR: 1913?, 1 ♀ (*W. M. Aders*); near Mazi Moja, viii.1924, 1 ♂ (*H. J. Snell*) (BMNH).

Anoplius (Orientanoplius) saegeri Arnold

(Text-figs 19, 22, 23)

Pompilus plebeius Saussure, 1891 : 266. LECTOTYPE ♀, MADAGASCAR (MHN), here designated [examined]. [Junior primary homonym of *Pompilus plebejus* Dahlbom, 1843.]

Pompilus plebejus Saussure; Saussure, 1892 : 365; ♀, ♂. [Incorrect subsequent spelling of *P. plebeius* Saussure, 1891.]

Anoplius saegeri Arnold, 1937 : 61. LECTOTYPE ♀, MADAGASCAR (MRAC), here designated [examined]; type-series given incorrect locality labels, 'Ile St. Thomé'. **Syn. n.**

Psammochares jocaste Banks, 1941 : 357. Holotype ♀, MADAGASCAR (ANS) [examined]. **Syn. n.**

LECTOTYPE DESIGNATIONS.

(1) *Pompilus plebeius* Saussure. There is no indication in Saussure's description that this species was described from other than a single female specimen. However, there are eight females in the collections of MHN, of which I regard as syntypes two which bear labels in Saussure's handwriting, 'Pompilus plebejus Ss ♀.' Both specimens have had the right fore wing removed and glued to a card, possibly to facilitate illustration. Monsieur R. Wahis has labelled the better preserved of the two 'Lectoholotype', and I am in agreement with his selection. The specimen also bears his typewritten label 'R. Wahis det. 1970. Anoplius saegeri Arn. ♀ Type de P. plebejus SAUSS.' I have also labelled, and here designate this specimen, as lectotype.

(2) *Anoplius saegeri* Arnold. Arnold gave no published holotype status to any of the three specimens in his type-series. The female and one male bear his red 'type' labels, the second male a paratype label of the type used by the MRAC. The female has been labelled, and is here designated as lectotype.

♀. Length 12–19 mm. Red-brown; more or less black coloration evident at pleural sutures, articulations of coxae, on postnotum, midventrally on mesosternum (=ventral part of true mesopleuron), anterior face and posterior edge of first tergite and sternite, most of second tergite, rest of abdomen. Yellow coloration posterolaterally on propodaeal rim. Wings yellow, with more or less diffuse infuscation terminally, outside the closed cells. Lower face and coxae with sparse silvery pubescence in fresh specimens. Eastern populations more extensively dark coloured.

Apical margin of clypeus concave, inner orbits convergent above, subparallel below. Morphologically very similar to *A. morosus* (p. 389) but frons flatter in larger specimens, more swollen in smaller specimens. Propodaeum higher, with a more direct shallow curve from postnotum to posterior rim when viewed in profile. Thorax as a whole appearing more robust than in *A. morosus*. SMC3 variable in form, normally as in *A. morosus*, but often more similar to that of *A. nigripes* (Text-figs 10, 11).

♂. Length 9–14 mm. Red-brown; with more or less black coloration, as in the female. Yellow coloration often borders: inner and outer orbits, mandibular edge, malar space, fore coxa, posterior margin of pronotum, posterolateral rim of propodaeum, often a band anteriorly on third tergite (may be concealed by telescoping of segments). Wings yellow, with diffuse infuscation terminally, often invading outer cells. Silvery pubescence may be extensive on fresh specimens, particularly on face and coxae, but also on pleurae, femora and elsewhere.

Morphologically as *A. morosus* (p. 389), with slight but constant differences in SGP and genitalia (text-figs 22, 23).

A. saegeri is closely related to *A. morosus*, but readily recognized by its distinctive coloration.

DISTRIBUTION. Madagascar; this species seems to occupy all the ecological zones on Madagascar which on mainland Africa are occupied by three distinct species (map, Text-fig. 19).

VARIATION. *A. saegeri* exhibits considerable variation in colour. Female specimens from the drier south-western parts of the island (Tulear, Fort Dauphin, Bekily) show a reduction in the amount of black coloration visible at the thoracic sutures, and the dark area on the mesosternum may be totally absent. The red-brown areas are generally of a lighter shade than is the case with specimens from more 'typical' areas in the central highlands, which conform most closely to the description given.

Specimens from the wet forest area of the east coast are very much darker, with the red-brown coloration replaced by black on the abdomen, propodaeum, and thorax save the prothorax, mesonotum, tegulae and scutellum. The yellow colour on the propodaeal flanges is obliterated. A female of this colour form is holotype of *P. jocaste*. Males reflect this geographical colour variation, but the form of the genitalia remains constant throughout the distributional range.

Certain specimens from the zone around Tananarive exhibit colour patterning which tends from that of the 'typical' populations towards that of the darker forest form. One female from Tzimbazaza, and another from Betongolo, whilst close to the normal colour form of the area, show a loss of the yellow coloration from the propodaeal flanges, and an increase in the amount of black visible at the thoracic sutures. Two other females, from Tananarive and Ankadimanga, also show a development of black colour on the thorax and propodaeum, although the yellow colour is not lost.

The Tananarive populations may themselves be regarded as intermediate between the extreme light-coloured south-western populations and those of the eastern forests.

Colour variability correlates superficially with the patterns of precipitation in the island, but certain exceptions can be noted, for example at Fort Dauphin, where the 'typical' form occurs in an area of high rainfall. It seems reasonable to speculate that the prevailing humidity and temperature in the actual nest site, rather than actual rainfall levels, are likely factors controlling the degree of development of dark coloration in this species. *A. bifasciatus* and *A. nigripes* on the African mainland also exhibit considerable colour variation of a similar type.

MATERIAL EXAMINED.

Pompilus plebeius Saussure, lectotype ♀, MADAGASCAR: Andrengoloka, no other data (MHN). *Anoplius saegeri* Arnold, lectotype ♀, MADAGASCAR: Tananarive (*C. Lamberton*). Mislabelled 'Ille de St. Thomé '(*H. de Saeger*)' in error (MRAC). *Psammochares jocaste* Banks, holotype ♀, MADAGASCAR: Tananarive, Moramanga district, Oriental forest (*C. Lamberton*) (ANS).

MADAGASCAR: no other data, 4 ♂ (*F. Sikora*) (MHN); 2 ♀, (ex coll. E. Andre) (*F. Sikora*) (MNHN); Tananarive, 5 ♀, 2 ♂ (MHN); 1919, 10 ♀, 1 ♂ (*Waterlot*) (MNHN & coll. Wahis); 1 ♀, (*C. Lamberton*) (USNM); 19.ii.1928, 1 ♂; i.1932, 1 ♂, (*A. Seyrig*); 10.iv.1948, 1 ♀ (MNHN); mislabelled 'Ile de St. Thomé' – collected at Tananarive by *C. Lamberton*, 2 ♂ (paralectotypes of *A. saegeri*) (MRAC); 30.iv.1968, 1 ♀ (*K. Guichard*) (BMNH); Tzimbazaza, 8.viii.1950, 1 ♀; 24.ix.1950, 1 ♀ (*R. Benoist*) (MNHN); vii.1950, 1 ♀, 1 ♂; i.1952, 5 ♀, 6 ♂ (*R. Benoist*) (MRAC & coll. Wahis); Andrengoloka, no other data, 1 ♀ (paralectotype of *P. plebeius*), 1 ♂ (MHN); Betongolo, xii.1947, 2 ♀ (*P. Clement*) (MNHN); Ankadimanga, xii.1957, 1 ♀ (*Jean-Elie*); Andramasina, 1931, 1 ♀ (*Lasere*); Ambatolampy, 1931, 1 ♀ (*Lasere*); Bekhara, iii.1937, 1 ♂ (*A. Seyrig*); Bekily, v.1933, 1 ♂; vi.1936, 1 ♂; xii.1936, 2 ♂; i.1937, 1 ♂ (*A. Seyrig*) (MNHN); v.1942, 1 ♀ (*A. Seyrig*) (MRAC); Tulear Province, Bevilany, 1000′, 12.iv.1968, 1 ♀, 1 ♂ (*K. M. Guichard*) (BMNH); Fort Dauphin, 15.iv.1968, 1 ♀, 1 ♂ (*K. M. Guichard*) (BMNH); 1936, 1 ♀ (*A. Seyrig*) (MNHN); Analahava, 1906, 1 ♀ (*J. Descarpentries*) (MNHN); Rogez, i.1933, 1 ♂ (*Seyrig*) (light colour form); iii.1935, 2 ♂; ii.1944, 5 ♂ (*Seyrig*) (dark colour form); Fito, v.1932, 1 ♂ (*Seyrig*); Marovato, xii.1943, 1 ♀ (*Abadie*) (MNHN); Rogez, Analandraraka, vi.1937, 2 ♀, 2 ♂ (*Seyrig*) (MRAC); Tamatave, ii.1934, 1 ♀ (*Olsoufieff*) (MNHN); Ile Europa, iv.1964, 1 ♀ (*P. Malzy*) (MNHN).

Anoplius (Orientanoplius) nigripes (Haupt) **comb. n.**

(Text-figs 11, 14, 17, 24, 25, 29)

[*Anoplius bifasciatus* (Tullgren) sensu Arnold, 1937 : 61; ♂. Misidentification.]
[*Africanoplius elongatus* (Ritsema) sensu Haupt, 1950 : 44; ♂. Misidentification.]
Africanoplius nigripes Haupt, 1950 : 45. Holotype ♂, ZAIRE (IRSNB) [examined].
Anoplius morosus bahimae Arnold, 1955 : 359. LECTOTYPE ♀, BURUNDI (MRAC), here designated [examined]. **Syn. n.**

LECTOTYPE DESIGNATION.

Anoplius morosus bahimae Arnold. Arnold did not specify which of three females and a male was holotype; both the male and one female bear his red 'type' labels. I have labelled, and here designate as lectotype, the female which bears Arnold's type-label.

♀. Length 13–19 mm. Black; at least clypeus, lower face, scapes, temples and occiput dark red-brown, which may extend to most of head, prothorax and legs in some populations. Wings yellow, fore wing with an apical infuscation which does not invade the cells (Text-fig 11), rarely enters extreme tip of marginal cell. Pubescence light brown to brownish black, rarely silvery.

Apical margin of clypeus transverse, inner orbits converging above, subparallel below, diverging slightly in larger specimens. MID varies from 0·50 to 0·54 × TFD. POL normally slightly less than OOL. Posterior pronotal margin arcuate, or with an indistinct median angulation. (Text-fig 14). Propodaeum evenly rounded. Fore basitarsus with three comb-spines, rarely approaching twice as long as median thickness of segment bearing them. SMC3 narrowed above, but normally subequal to SMC2 on radial vein (Text-fig. 11).

♂. Length 10–15 mm. Coloration similar to female; red-brown areas of female more frequently brownish yellow in male; median black area on clypeus, black area on frons reaching antennal insertion. Posterior margin of pronotum with yellowish brown transverse band. Patches of same colour on propleura and anteriorly on fore coxae. Otherwise black. Fore wing yellow with an apical infuscation as in *A. morosus* (Text-fig. 10), but occasionally infuscate area reduced. Hind wing with apical area and hind margin infuscate.

SMC3 of fore wing narrowed above, but equal to or distinctly longer than SMC2 on radial vein. SMC3 greater in area than SMC2. Genitalia (Text-fig. 25). SGP (Text-fig. 24) more strongly arched transversely than is that of *A. morosus*, normally truncate apically, but sometimes arcuate.

Females of this species have previously been confused with those of *A. morosus* (p. 388). The male is quite distinctive, however, but has always been regarded as the male of *A. bifasciatus* (p. 400).

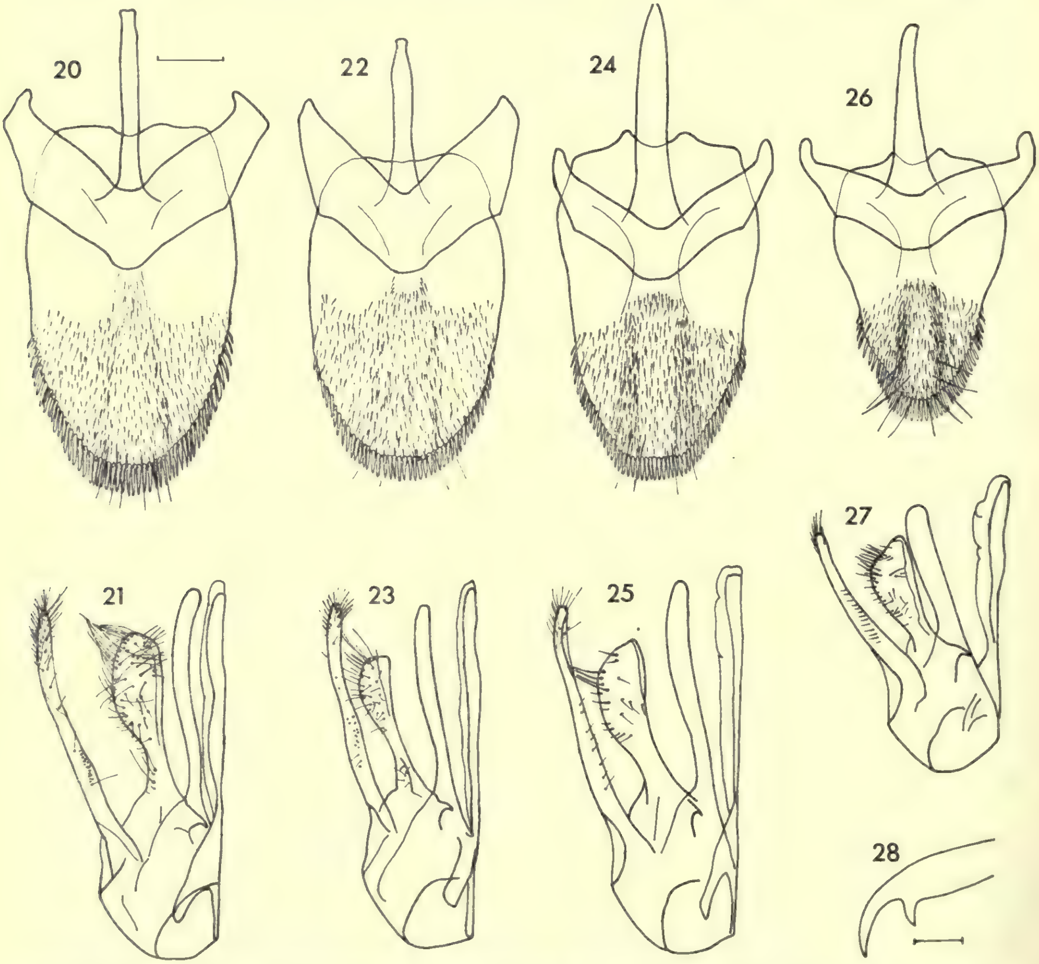
DISTRIBUTION. Central and Eastern Africa (map, Text-fig. 29).

VARIATION. Populations of highland Kenya, Uganda and eastern Zaire are extensively black, with some red-brown only on the face. Females from east coastal and southern populations show a much greater development of red-brown coloration, to the extent that they have always previously been confused with *A. morosus* females. The black area on the frons is reduced to the area of the ocellar triangle alone, the antennae are red-brown (but never wholly orange), the pronotum, tegulae, dorsal surface of the scutellum, tibiae and tarsi also so coloured. Males are similarly variable; southern populations show a reduction of the black area on the frons and have a red-brown pronotum, the posterior margin of which is frequently yellow. The mesonotum and scutellum also have small red-brown patches. The fore legs and mid and hind tibiae may be more or less red-brown, tending towards brownish yellow. The antennae, save a few terminal segments, develop the colour of the face. There is also a development of silvery pubescence above the clypeus, on the fore coxae, and on the neck and collar of the pronotum.

One female from Amani and one from Mlange exhibit coloration intermediate between the extremes described; the pronotum has some red-brown coloration, but with much black anteriorly. The black area on the frons is extended well beyond the ocellar triangle. The tibiae and tarsi are red-brown, however. One black female from Wawamba has an interrupted band of red-brown on the posterior pronotal margin, as do the lectotype and paralectotype females of *A. morosus bahimae*. Some females of the dark form have a more extensive apical infuscation of the forewing, approaching in form that of *A. morosus*.

One male from Mlange shows a coloration intermediate between that of the dark form and that of the southern populations; the black area extends over most of the frons, but not the clypeus. The brownish yellow area of the pronotum is reduced by the encroachment of black areas anteriorly and laterally. The mid and hind tarsi, mesonotum and scutellum are black, also the antennae save the scape, pedicel and first flagellar segment, and ventral portions of the second and third segments.

Three males from Bambesa have rather different genitalia, the digiti volsellari being narrower than those of other populations. The SGP is apically rounded, but this condition is observed in some southern populations also. One of these males has the pronotum black, with a streak of yellow on the posterior pronotal margin.



FIGS 20–28. 20–27. ♂ SGP and ♂ genitalia, left half, ventral view. 20, 21. *A. morosus.* 22, 23. *A. saegeri.* 24, 25. *A. nigripes.* 26, 27. *A. bifasciatus.* 28. *A. bifasciatus*, ♂ claw. Scale: 20, scale line=0·5 mm; 21–27, same scale; 28, scale line=0·1 mm.

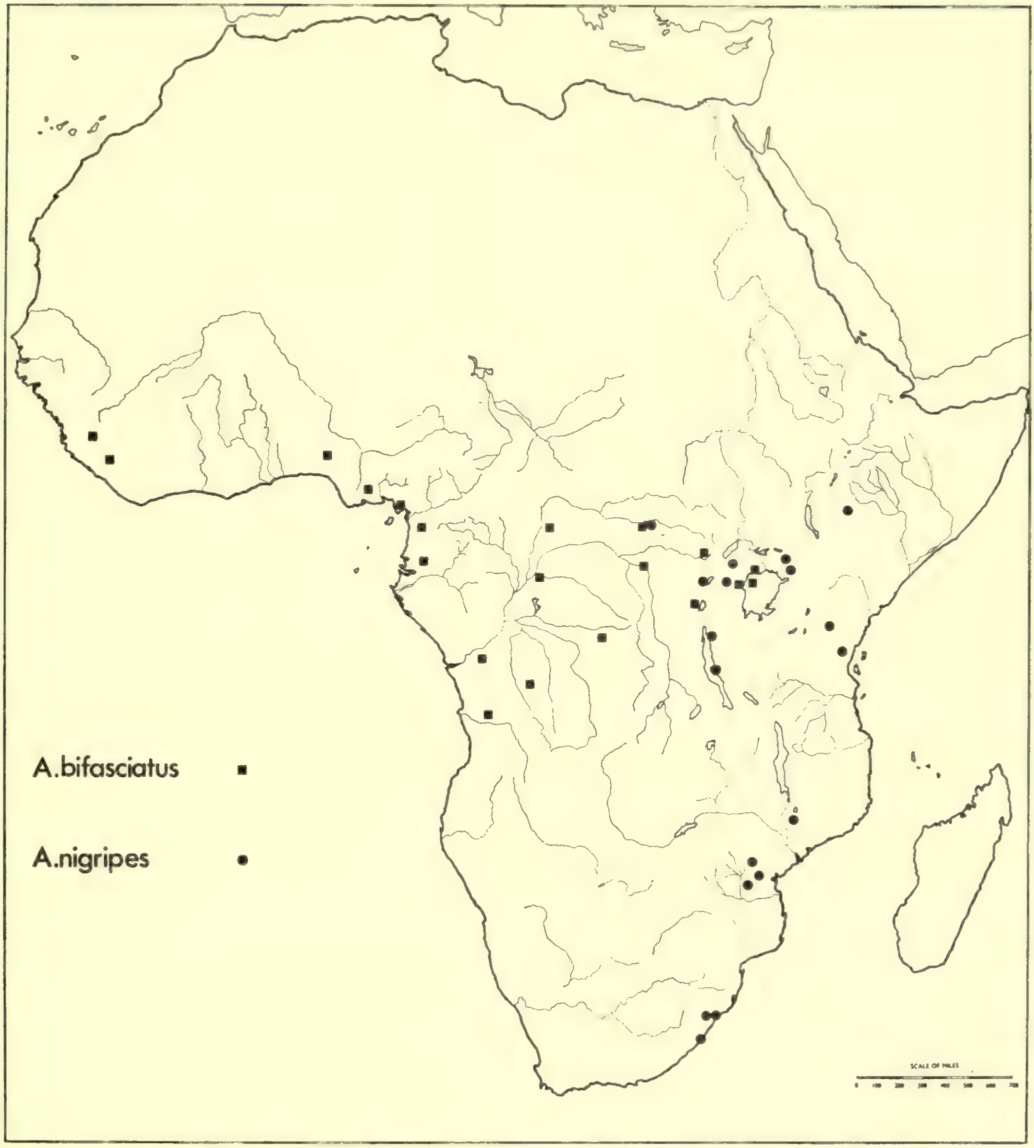


FIG. 29. Map showing the known distribution of *A. nigripes* and *A. bifasciatus*.

BIOLOGY. A female of *A. nigripes* in the BMNH collections, taken by the Second Oxford University Tanganyika Expedition in the Kungwe District, bears a label 'Carrying spider in forest'. I have not been able to trace any specimen of prey in the Museum's collections.

MATERIAL EXAMINED.

Africanoplius nigripes Haupt, holotype ♂, ZAIRE: Parc Nationale Albert, Lac

Mugunga-Bulengo, ii.1934 (*Mission G. F. de Witte*) (IRSNB). *Anoplius morosus bahimae* Arnold, lectotype ♀, BURUNDI: Bururi, 1800–2000 metres, 5–12.iii.1953 (*P. Basilewsky*) (MRAC).

BURUNDI: Bururi, 1000–2000 m, 5–12.iii.1953, 1 ♀, 1 ♂ (*P. Basilewsky*) (paralectotypes of *A. morosus bahimae*) (MRAC); same data, 1 ♀ (NMSR). ETHIOPIA, Gatelo Amaiya, 4.xi.1911, 1 ♂; Higo Samula, 30.x.1911, 1 ♂ (*R. J. Stordy*) (BMNH). KENYA: Malawa Forest, 6.vi.1952, 1 ♂ (NMSR); Nandi Plateau, 5700–6200′, vi.1911, 1 ♀; southern foot and slopes of Mt Elgon, 5100–5800′, vi.1911, 1 ♀ (*S. A. Neave*) (BMNH). MALAWI: Mlange, xii.1912–ii.1914, 21 ♀, 8 ♂ (*S. A. Neave*) (BMNH). MOZAMBIQUE: Chimanimani Mountain, ii.1958, 1 ♂ (*University of Cape Town Expedn*) (NMSR). RHODESIA: Chirinda, ii.1961, 1 ♀ (NMSR); Mt Selinda, xii.1935, 1 ♀ (*G. van Son*) (TM); Valley of Musa, 1000 m, 1905, 2 ♂ (*G. Vasse*) (MNHN). SOUTH AFRICA: Zululand, Eshowe, iv.1926, 1 ♀; vi. 1926, 1 ♀ (*R. E. Turner*) (BMNH); Eshowe, iv.1960, 2 ♂ (BMNH, NMSR); Eshowe, 1–7.x.1949, 1 ♀ (*A. L. Capener*) (USNM); Natal, Umhlanga, iv.1941, 1 ♀ (NMSR); Natal, Umtentweti, vii.1951, 1 ♂ (*A. L. Capener*) (USNM). TANZANIA: Kilimanjaro, Marangu, 13–20.vii.1957, 1 ♂ (*P. Basilewsky*) (MRAC); Amani, ii.1904, 1 ♀ (*Vosseler*) (MHNU); Amani, 1 ♀ (*F. X. Williams*) (coll. Wahis); Kungwe, 'Camp II,' 8.ix.1959, 1 ♀ (*Oxford University Tanganyika Expedn*) (BMNH). UGANDA: western Ankole, 4500–5000′ x.1911, 2 ♀, 1 ♂ (*S. A. Neave*); Wawamba, 1895?, 1 ♀ (*Scott Elliot*); Busongoro, xii.1927, 1 ♂ (*G. D. H. Carpenter*) (BMNH). ZAIRE: Region des Lacs, 1 ♀ (*Sagona*); Bambesa, 15.ix.1933, 1 ♂; 30.x.1933, 2 ♂ (*H. J. Bredo*); Uelé, 30.x.1933, 1 ♂ (*J. Leroy*); Haute-Uelé, Abimva, 1925, 1 ♂ (*L. Burgeon*) (MRAC).

Anoplius (Orientanoplius) bifasciatus (Tullgren)

(Text-figs 12, 15, 18, 26–29)

Pompilus bifasciatus Tullgren, 1904 : 441. Holotype ♀, CAMEROUN (NR) [examined].
Pompilus bavinganus Strand, 1911 : 500. Holotype ♀, CAMEROUN (MNHU) [examined].
Anoplius apicalis Haupt, 1929 : 144. Holotype ♀, 'CAPLAND' (MNHU) [examined]. **Syn. n.**
Elaphrosyron multipictus Arnold, 1937 : 42. Holotype ♂, ZAIRE (MRAC) [examined]. **Syn. n.**
Anoplius bifasciatus (Tullgren); Arnold, 1937 : 61; ♀.
Anoplius bifasciatus var. *ornatus* de Saeger, 1945 : 113. Holotype ♀, ZAIRE (MRAC) [examined].
[*Africanoplius elongatus* (Ritsema) sensu Haupt, 1950 : 43; ♀. Misidentification.]

♀. Length 12–20 mm. Black; clypeus, face, antennae, prothorax, coxae, tibiae and tarsi in whole or in part red-brown, the clypeus always so. A line adjacent to inner orbits, line on temple adjacent to outer orbit, and line bordering posterior pronotal margin (often interrupted medially) are frequently pale yellow. Yellow markings occasionally much more extensive, affecting spots on pronotum anteriorly beneath streptaulus, mesonotum, scutellum, meso- and metapleurae, and hind coxa. Wings yellow, with an apical infuscation which occupies SMC3 and most of marginal cell (Text-fig. 12). Lower face, coxae, and often much of pleurae, propodaeum and femora with silvery pubescence, elsewhere black.

Apical margin of clypeus transverse. Inner orbits converging above, parallel below. Face narrow, MID varies from 0·44 to 0·51 × TFD. POL and OOL subequal. Posterior pronotal margin obtusely angulate (Text-fig. 15). Propodaeum broader than long, evenly rounded, with very slight flattening on declivity. Fore basitarsus with three combspines, one to two times median thickness of segment bearing them. SMC3 narrowed above, subequal to or shorter than SMC2 on radial vein.

♂. Length 11–15 mm. Black, more or less extensively maculated with yellow, which may be bordered by red-brown, particularly ventrally on antennae and coxae, and on femora and tibiae. Yellow coloration at least on mandibles, border of inner orbit on face, and on clypeus, ventrally on scape, border of orbit on temple, spot beneath streptaulus, posterior pronotal margin, propleuron, small median spot posteriorly on mesonotum, small spot on base of mesopleuron, small median spot on first abdominal tergite, and paired spots anteriorly on second and third tergites. Also patches ventrally on fore and mid coxae, and on tibiae. In extreme development, yellow patches on face are confluent across top and bottom of clypeus, malar space and on temple and mandible. Spot beneath streptaulus enlarged, neck and propleuron yellow, additional pronotal spot, mesopleuron with much enlarged patch and additional spot, mesonotum, scutellum and postscutellum, propodaeum with a median and lateral patches (which may be confluent), metapleuron with two patches; first tergite with large spot, second and third tergites with paired lateral patches. All coxae, femora, tibiae, and the fore tarsi extensively yellow and red-brown, mid and hind tarsi black. Extensive silvery pubescence on head, thorax, coxae and propodaeum, dark on abdomen. Fore wing fuscohyaline, faintly tinged with yellow, infuscate apically as in female. SMC3 narrowed above, shorter on radial vein than is SMC2. Genitalia (Text-fig. 27); SGP strongly arched transversely (Text-fig. 26). Parapenial lobes of specimens from western populations longer, more like those of *A. nigripes* (Text-fig. 25) than of the Uganda population figured.

A. bifasciatus is a very distinctive member of the Ethiopian pompilid fauna.

DISTRIBUTION. Widely distributed through humid forest areas of West and Central Africa (map, Text-fig. 29).

GYNANDROMORPH. A gynandromorph individual in the collections of the MRAC, collected at Bokuma (Zaire), by P. Hulstaert, is predominantly female. The right half of the head is also female, but the left half is male (Text-fig. 18). The left antenna is male, the right antenna female, but of male dimensions. The specimen has been left over-long in cyanide, so that yellow areas are substantially pink; however, the pattern of facial coloration agrees well with that of the male.

VARIATION. This species exhibits marked variability in the extent of yellow areas, more particularly in the male. Females also exhibit variability in the extent of red-brown areas on the head, pronotum and legs. The type of *A. apicalis* Haupt is a female with extensive red-brown coloration, but without the yellow line on the posterior pronotal margin. Haupt's identification of the male of *A. morosus* with this female on the basis of colour and particularly of the area of infuscation of the fore wing, has given rise to much of the confusion within this group of species, and to a proliferation of names. On a basis of known distribution, it seems unlikely that the type of *A. apicalis* was collected at the Cape, and it is probably mislabelled. I have seen specimens similar to the type from Zaire and West Africa.

Arnold also did not recognize the true male of *A. bifasciatus*, and described it in *Elaphrosyron* as *E. multipictus*. The facial colour pattern of the gynandromorph described above, and yellow-maculated females (*A. bifasciatus* var. *ornatus* de Saeger), together with distributional data, amply confirm the association of sexes here made. Since Arnold failed to appreciate that he had before him males of three species in the *morosus*-group, he did not seek the true female of the males (*A. nigripes*) which he mistakenly associated with *A. bifasciatus*.

MATERIAL EXAMINED.

Pompilus bifasciatus Tullgren, holotype ♀, CAMEROUN: ('Camerun') (*Sjostedt*) (NR). *Pompilus bavinganus* Strand, holotype ♀, CAMEROUN: 'Kamerunberg' (Ekona), Bavinga, 22.x.1910, 400–600 m (*E. Hintz*) (MNHU). *Anoplius apicalis* Haupt, holotype ♀, 'CAPLAND' (*Krebs*), no further data, locality almost certainly incorrect (MNHU). *Elaphrosyron multipictus* Arnold, holotype ♂, ZAIRE: Uele, Bambesa, 30.viii.1933 (*J. V. Leroy*) (MRAC). *Anoplius bifasciatus* var. *ornatus* de Saeger, holotype ♀, ZAIRE: Uele, Bambesa, 6.vi.1937 (*J. Vrydagh*) (MRAC).

ANGOLA: Salazar, Field Station of I.I.A.A., on path through dense humid forest, 13.iii.1972, 1 ♂ (*D. Hollis, BMNH Southern African Expedn* 1972) (BMNH). CAMEROUN: Ebolowa, Nkuemvone, 29.vii.1967, 1 ♂ (*L. Matile*) (MNHN); 'Kamerun', 1 ♀ (*Conradt*) (MNHU). GABON: 'Gaboon', 1 ♀ (*Theorin*) (NR); Muni, Mts de Cristal, 15–31.x.1969, 1 ♂ (*A. Villiers*) (MNHN). LIBERIA: Belleyella, 1940, 1 ♂ (*W. M. Mann*) (USNM). NIGERIA: Ife-ife, 25.v.1969, 1 ♂ (*J. T. Medler*); Okigwi, 26.v.1910, 1 ♀ (*J. J. Simpson*) (BMNH). SIERRA LEONE: Njala, 14.xi.1932, 1 ♀; vi.1936, 1 ♀ (*E. Hargreaves*) (BMNH); Sierra Leone, 1 ♂ (*A. Afzelius*) (NR). TOGO: 1 ♀, no further data (coll. Wahis). UGANDA: Tero Forest (W. shore of L. Victoria), vii.1912, 2 ♀, 17 ♂ (*C. C. Gowdey*) (some paratypes of *E. multipictus*) (BMNH, NMSR); Tero Forest, S. E. Buddu, 3800′, 28.ix.1911, 1 ♀ (*S. A. Neave*); W. shores of L. Victoria Nyanza, Buddu, 3700′, 19–25.ix.1911, 9 ♀, 3 ♂ (*S. A. Neave*); Budongo Forest, Unyoro, 3400′, 11–15.xii.1911, 3 ♀, 1 ♂ (*S. A. Neave*); Entebbe, 1–11.ix.1911, 1 ♀, 1 ♂ (*S. A. Neave*); Entebbe, 12–14.x.1914, 1 ♀ (*C. C. Gowdey*); Kivuvu, 19.viii.1913, 1 ♀ (*C. C. Gowdey*); Kampala, 13.ix.1915, 1 ♀ (*C. C. Gowdey*); Bugalla Island, viii.1929, 1 ♂ (*G. D. H. Carpenter*); Namulala Forest, 27.x.1925, 2 ♂ (*G. L. R. Hancock*) (BMNH); Mabira Forest, 21.v.1952, 1 ♀ (NMSR). ZAIRE: Bokuma, ii–iv.1941, gynandromorph (*P. Hulstaert*); Kivu, R. Tshinganda, iii.1950, 1 ♀ (*G. Marlier*); Kivu, Mingazi, 1951, 2 ♀ (*H. Bomans*); Kibali-Ituri, Yindi, x.1948–iii.1949, 1 ♀ (*A. E. Bertrand*); Haute-Uele, Moto, xi.1923, 1 ♀ (*L. Burgeon*); Dika, iii.1925, 1 ♂ (*H. Schouteden*) (paratype of *E. multipictus*); Bambili, 1 ♂ (*Rodhain*) (paratype of *E. multipictus*); Paulis, xii.1947, 2 ♀ (*P. L. G. Benoit*); Dingila, v. 1933, 1 ♀ (*H. J. Bredo*); Medje, 10.vii.1910, 1 ♂ (*Lang & Chapin*); Bambesa, viii. 1933, 1 ♀; 15.ix.1933, 1 ♀ (paratype of var. *ornatus*); xi–xii.1933, 1 ♀, 4 ♂ (*H. J. Bredo*); ii.1937, 1 ♀; iv.1937, 4 ♀ (*J. Vrydagh*) (MRAC); 15–19.ix.1938, 1 ♀ (*J. Vrydagh*) (IRSNB); xii.1946, 1 ♀ (*P. L. G. Benoit*); Eala, vii–xii.1935, 3 ♀, 2 ♂ (1 ♀ paratype of var. *ornatus*) (*H. J. Bredo*); Bayenga, 12.xi.1956, 1 ♀ (*R. Castelain*); Ubangi, Abumombazi, 23.ii.1932, 1 ♀ (paratype of var. *ornatus*) (H. J. Bredo); Kilo, Mongbwalu, vii.1937, 1 ♀ (*Scheitz*); Thysville, 30.xi.1952, 1 ♂ (*P. Basilewsky*); Sankuru, Komi, 4.ii.1930, 1 ♂ (*J. Ghesquière*) (paratype of *E. multipictus*); Stanleyville, iii.1926, 1 ♀ (*J. Ghesquière*) (MRAC); Coquilatville, 1 ♀ (NMSR); Beni, 1120 m, ii.1931, 1 ♂ (*L. Lebrun*); Ponthlerville, 24.vii.1947, 1 ♀ (*M. Poll*); Kwango, Panzi, 12.ii.1939, 1 ♀ (*Bequart*) (MRAC); Uele, Poko, viii.1913, 1 ♀ (*Lang & Chapin*); Bas-Uele, 1 ♀; Equateur, 1 ♀ (coll. Wahis).

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